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# Exterior accessibility issues: a study of the outdoor spaces connected with housing facilities at Louisiana State University

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EXTERIOR ACCESSIBILITY ISSUES:  
A STUDY OF THE OUTDOOR  
SPACES CONNECTED WITH  
HOUSING FACILITIES  
AT LOUISIANA STATE  
UNIVERSITY

A Thesis

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
In partial fulfillment of the  
Requirements for the degree of  
Master of Landscape Architecture

in

The School of Landscape Architecture

by  
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August 2003



To my parents, Frank and Suzanne Lewis  
Thanks

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## **ABSTRACT**

This document investigates Louisiana State University's progress in becoming a fully accessible campus, specifically in regard to student housing and the surrounding amenities such as laundry facilities, dining facilities and recreational areas. The benchmarks used for determining this include the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, the Universal Design Handbook and surveys of other campuses that have made greater strides in this area. This document seeks to determine the extent to which Louisiana State University has become accessible for wheelchair users and bring to light examples of areas of difficulty in the housing cluster area. Equally important in this document are issues of aesthetics and the consideration of the psychological ramifications of mandated architectural components such as ramps and curb cuts being placed in out of the way areas, thereby creating a hierarchical disadvantage for physically impaired users of the campus and lessening the quality of the overall experience. The overarching intention of this document is to provide a framework for improving accessibility in order to bring the entire university community together in fully accessible spaces.

## **CHAPTER 1 INTRODUCTION**

### **Background**

In the late 1980s and early 1990s I was employed as a facility manager for Sears. During this time I endeavored to make the three stores I was responsible for a more hospitable environment for our customers. Most of the changes I made were cosmetic in nature, brighter lighting, better display shelving, larger clothes racks, new paint, and more exotic merchandise displays. In the early part of 1990 the Americans with Disabilities Act (ADA) was passed by Congress and signed into law by President George Bush. Along with this law came a new responsibility for me, bringing those three stores into compliance with a broad new law. I received a copy of the ADA and was instructed by our national headquarters to review it and make the necessary changes to our stores. Upon reviewing the new law I came to realize that I had been ignoring a unique portion of the population and was thus perpetuating discriminatory practices, which is something that I found to be reprehensible. We immediately began making changes to the stores so that all could enjoy the shopping experience equally. Though it took several years to complete the entire process I noticed almost immediately that the stores were becoming better for everyone. Wider aisles, larger fitting rooms and restrooms, more spacing between the merchandise racks, all of these things created a more enjoyable shopping experience for non-ambulatory as well as ambulatory persons. During the remodeling my interest in accessibility continued to grow, as did my realization that the new standards created a better overall experience. Later I found myself taking a new direction in life and began to study Landscape Architecture where my previous experience with the ADA lead me to an interest in accessibility issues in the built outdoor environment.

### **Problem Statement**

As the flagship institute of higher education in the state of Louisiana, I think that Louisiana State University (LSU) has a responsibility to exemplify inclusiveness. Unfortunately, I have not found that to be the case campus-wide. Due to the age of many on-campus facilities the ADA does not apply across the board, therefore, the University is not in violation of the law by not making accessible all of the spaces that will be discussed in this document. Other factors, such as monetary issues and historic preservation must also be considered when making changes to the University. Nevertheless, I believe that LSU should strive toward becoming fully accessible. I choose to study the dormitory style residences on campus, henceforth referred to as student housing, and the buildings and sites that are crucial to the quality of life of students who use them. Therefore this thesis deals primarily with the

outdoor spaces directly connected to or leading to student housing and their associated facilities, such as, dining halls and laundry facilities. (It should be noted that though the Department of Residential Life no longer refers to any of the residential life buildings as dormitories, this thesis is a study of the non-apartment style units – i.e., buildings which consist of halls or clusters of rooms with detached bathrooms and lacking individual kitchen facilities.)

Even when LSU is in compliance with the ADA by meeting the minimum standards, it's failure to consider the overall experience often results in physically impaired persons not feeling as though they are a part of the University community. Poorly maintained or improperly located access routes force use of secondary access routes and entrances and may cause the physically impaired user to not be able to access certain portions of the campus. In addition, segregated entries and access routes negatively impact all users. The negative messages conveyed by being routed to the back or side entrance, past garbage collection sites and building maintenance areas is certainly not as pleasant as being able to use a well designed primary entrance and sends a message that some people are not as important as others. Sidewalks that are badly cracked or broken, (Fig. 1) missing ramps and curb cuts or ramps and curb cuts that are poorly drained present not only physical but also psychological barriers which can result in the alienation of physically impaired users and at the same time present a danger to all users. It should be noted also that damaged or poorly planned conditions detract from the overall experience for everyone by presenting a less than aesthetically pleasing environment. Therefore, both physical and psychological barriers will be explored in this thesis.

## **Objective**

The overall objective of this thesis is to highlight physical and psychological barriers associated with student housing for physically impaired persons on the campus of Louisiana State University. This thesis is not intended as a criticism of what LSU has failed to do, rather as an impetuous for developing a universally accessible campus. During the research phase of this document I came to realize that our University, though beautiful and well maintained in many respects, is not making the large strides necessary to become universally accessible. It is my hope that by pinpointing existing physical and psychological barriers on LSU's campus that those responsible at LSU will redouble efforts towards making the campus fully and equally accessible. Louisiana State University is a public space, paid for by the taxes that all state citizens contribute and should therefore be a comfortable, equally accessible space for all of its users. Attending University is often the first time a person lives away from their

parents home and all of the comforts associated with that home. As such, any University should endeavor to provide a comfortable setting that equally meets the needs, both physical and psychological, of all users.



(Figure 1) Cracked sidewalk in the Pentagon Housing Courtyard. Not only is this inaccessible for many physically impaired individuals, it is also dangerous and aesthetically displeasing.

According to the 1998 N.O.D./Harris Study of Americans with Disabilities, the number one problem for adults with disabilities is lack of employment or underemployment. “Employment continues to be the area with the widest gulf between people with disabilities and the rest of the population. Only three in ten working-age adults with disabilities are employed full or part-time, compared to eight in ten adults without disabilities.” (Risher 1998, 5) Since it is the responsibility of a University to provide the setting for a higher education, and hence, the preparation for a career, the more accessible that space becomes the better it will be for all concerned.

Rather than designing a fully accessible section of campus, I intend to provide information on why it is necessary, where the problems exist, and the best approach towards correcting those problems. Two chapters deal exclusively with concepts that can be applied to the problems encountered. The first of the two is drawn from the ADA, with solutions provided in textual and graphic models. While the ADA does provide a basic minimum it does not address many aspects of the overall experience. For example, a curb cut or ramp may provide access and still not fully integrate the user into the space. The ADA also does not address aesthetic considerations such as planting designs. The second pulls from a growing school of thought known as Universal Design that promotes designed spaces for use by everyone on an equal basis. In Universal Design the quality of the experience takes precedence over pure functionality.

## **Approach**

To fulfill the objectives of this thesis I first conducted an extensive literature review, beginning with a review of the ADA. From the ADA I pulled information that was pertinent to residential life on a University campus, such as curb cuts, ramps, recreational spaces, assembly areas, access routes and so forth. I then consulted other documents such as the 1974 Fair Housing Act (Title 34), the 1998 N.O.D. / Harris Survey of Americans with Disabilities, and numerous books and journal articles on Universal Design. In addition to these sources I referred to journal and periodical articles concerning or written by persons with a physical impairment.

Interviews were conducted with Benjamin Cornwell, Assistant Director, LSU Office of Disability Services, in order to narrow the scope of the research and determine the physical area(s) of campus that are in most need of study. Other interviews were conducted with members of LSU's Office of Facility Planning, specifically with Jason Solieau, in order to determine the problems faced by LSU in retrofitting for accessibility.

After identifying the study areas I obtained and modified existing maps of campus using AutoCAD. I then overlaid accessible routes and non-accessible routes in and around each area of study. I also photographed the problem areas and spent three to five hours in each of the areas at different times during the day over the course of three weeks observing how (and by whom) they were used.

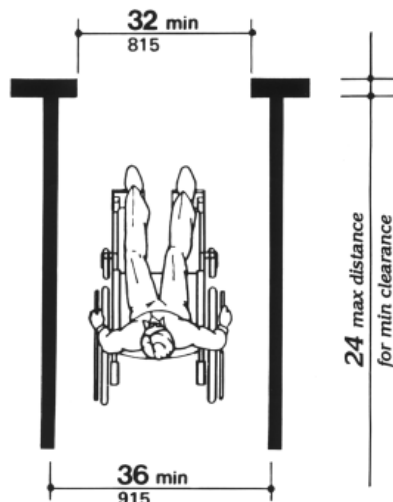
In addition to the information on laws and regulations regarding physical accessibility, I also reviewed many books, articles and websites concerning psychological barriers and their effects. Psychological barriers pose a significant challenge to many physically limited individuals, and as such need to be addressed as thoroughly as the actual physical barriers on campus.

## CHAPTER 2 LITERATURE REVIEW

### Americans with Disabilities Act

I used the ADA as a starting point to develop a set of guidelines for conducting this study. Within the ADA are definitions such as accessible route, circulations path, entrance, etc. which provide a legal standing for determining what is and what is not in compliance with federal law, or at least what should be done to improve the lives of persons with physical limitations. The ADA act also provides both textual and graphic information that is helpful in developing a universally accessible space. For example, in the section titled 'Accessible Routes', a general definition of accessible routes is provided. Following the general definition additional information, such as: the most desirable location of accessible routes, passing space within an accessible route (Fig. 2), head room within an accessible route, surface texture along an accessible route, slope specifications for accessible routes, doors, egresses, areas of rescue assistance and exceptions.

The most current textual ADA information can be obtained at the following Internet address: <http://www.access-board.gov/adaag/html/adaag.htm> and the most current graphic information at: <http://www.access-board.gov/html/tables/tables-1.html>. This type of detailed information is available through the ADA pertaining to most topics in this thesis. Since the ADA will be referenced frequently in this thesis Appendix A provides the relevant portions of the law in full.



(Fig. 2) An example of ADA graphics and captioning. [Figure 1 of ADAAG: Minimum Clear Width for Single Wheelchair] The minimum clear passage width for a single wheelchair shall be 36 inches (915 mm) minimum along an accessible route, but may be reduced to 32 inches (815 mm) minimum at a point for a maximum depth of 24 inches (610 mm), such as at a doorway.



## **Fair Housing Act of 1974 – Title 34**

In addition to the ADA I also consulted Title 34 of the 1974 Fair Housing Act. Sections of this law provide information that is directly relevant to housing conditions for University students with disabilities, for example, Sec. 104.45 – Housing, is divided into two sections: Housing provided directly by the recipient of federal financial assistance and housing provided by a secondary party with the assistance of the primary recipient. The ADA and Title 34 of the Fair Housing Act provide the most current law pertinent to student living conditions. Even in cases where, due to age or historical significance, LSU is not required by law to comply with the acts, the laws provide a good starting point for evaluating conditions at LSU. As with the ADA, the relevant sections of Title 34 are provided in Appendix B.

## **National Organization on Disabilities**

The National Organization on Disabilities / Harris Survey of Americans with Disabilities (Risher, 1998) is an ongoing joint effort by the National Organization on Disabilities (N.O.D.) and Louis Harris and Associates, Inc. to track changes in the lives of persons with disabilities. To date this longitudinal study has been conducted three times by Louis Harris and Associates; first in 1986, then again in 1994 and most recently in 1998. The studies were conducted using national telephone surveys of both persons with disabilities and persons without disabilities and covered a wide range of demographic characteristics including: sex, region of the United States, type of geographical area (urban, suburban, rural), educational level, household income, race and marital status. By using both physically impaired and non-physically impaired persons the study provides a fair set of criteria to judge the conditions that persons with physical impairments most often encounter.

The portions of this study that focus on quality of life measurements, such as: satisfaction with life, reactions from others, common identity and so on proved helpful in deciding to include psychological barriers as a part of this thesis since it points out that many of the problems associated with having physical limitations are social in nature instead of actual physical impediments, in fact, many of the problems noted at LSU have to do with these issues.

## **Psychological Barriers**

The information obtained from the N.O.D. / Harris survey inspired me to delve much more deeply into the area of psychological barriers as this seems to play a major role in isolating persons who confront physical barriers on a daily basis. I decided to conduct this portion of my research by consulting on-line, first party information. I specifically wanted to read accounts written by persons with physical limitations, either about themselves or other

persons with physical limitations. This led me to a wealth of information that exceeded what I had expected and provided me with a wide range of psychological barrier issues.

The range of psychological barriers studied includes:

1. A feeling of indifference by non-physically impaired persons toward persons with physical impairments.
2. False assumptions about persons with physical impairments.
3. Social isolation
4. Self-esteem issues
5. Stress-illness and Social Support

### Indifference

Many first-person accounts of the perceived indifference towards persons with physical limitations deal with situations wherein a person with a physical limitation was in need of some type of assistance. Kevin Robinson reported one such situation:

“I’ve always wanted to visit San Antonio, so when the opportunity arose recently, I packed my wheelchair and headed to the airport with my girlfriend and one of my great caregivers. Traveling with a wheelchair is always an adventure, and great diligence is often required in order not to end up without one’s wheels. Airlines, for many years, had a horrible reputation for mishandling wheelchairs and wheelchair users. I have friends who use power chairs, and the stories they tell about baggage handlers who disassemble the electronic computerized chairs for easier storage are frightful.

“Imagine flying halfway across the country (or halfway around the world) only to learn that the motor and computerized brain of your wheelchair burned up when the baggage person at your destination plugged the wrong wires together when trying to reassemble it – without a clue how it came apart in the first place!

“A standard folding wheelchair is harder to damage, but easier to lose. I always request a door tag so that my chair will be in the jet way when they strap me into one of those aisle chairs and roll me out of the plane. But some years ago, the captain and crew on a flight into Denver were eager to be under way, and they assured me that my wheelchair was on the way up. I sat in the terminal, strapped helplessly to the pseudo-refrigerator dolly, for almost an hour. There were airline workers everywhere, and despite my pleas for help, each chose not to make eye contact. Dozens of passengers did the same, but eventually I persuaded a passerby to call airport security.” (St. Louis Post-Dispatch [St. Louis], 28 June 1998)

Treatment of this sort should never occur, but evidently does on a daily basis even at LSU. As such, the indifference exhibited towards persons with physical limitations seems to lead to many people with physical limitations choosing to abstain from many social opportunities for the sake of self-protection. Simply meeting the minimum legal standard for accessibility does not dramatically improve either the physical or psychological opportunities for persons with physical limitations. It is important that everyone who is responsible for the overall accessibility of LSU’s campus should be made aware of the psychological impact that only meeting minimum requirements can have on persons with physical limitations. An analogical comparison can be drawn between the

discrimination faced by persons of color in the recent past and discrimination faced by persons with physical limitations in the present. Thankfully we as a nation decided that discrimination based on a person's race was wrong. Now it is time that we realize that we are still guilty of discrimination of persons with physical limitations and eliminate this type of discrimination as well.

### False Assumptions

False assumptions concerning persons with physical limitations also play a role in creating psychological barriers. Historically, these assumptions have led to some horrific scenarios. For instance, during the Nazi rule of Germany much of "Germany's medical establishment, acting both with and without the acquiescence of the Nazi government, systematically killed their severely disabled and chronically mentally ill patients. These people were said by their doctors to be 'useless eaters' – persons with 'lives not worth living'" (Gallagher 1995, 401).

Other less horrific, but also disturbing assumptions include the idea that all physically impaired persons must get along since they are all physically impaired. This is no truer than to say, "all redheads should get along with other redheads because they share the same hair color" (Tada 1992, 88). Or that physically impaired persons have lower performance levels at work, that the cost of accommodating a physically impaired person is extremely high, that physically impaired persons have high absenteeism rates, etc. At LSU there is no evidence to show that persons with physical limitations are any less capable than any of their non-physically limited counterparts.

Unfounded assumptions about any individual can cause that person harm, and in the case of persons with a physical limitation, it may contribute to the building of psychological barriers.

### Social Isolation

Psychological barriers in conjunction with physical barriers oftentimes lead a physically impaired individual to become isolated thereby missing out on the many opportunities that life has to offer. Several studies cited in the Journal of Applied Social Psychology indicate that even when a physically impaired person goes into a social situation they are often still left in an isolated position to a much higher degree than non-physically impaired persons. For example, in interactions of dyadic pairs of individuals, with one being physically impaired and the other being non-physically impaired the following was found: "In these interactions – which have been typically brief and between strangers – nonphysically impaired persons display more discomfort, terminate conversations earlier, smile less and exhibit more inhibited gross motor behavior when paired with a person with a disability" and "Furthermore, non-physically impaired persons will avoid interacting with a physically impaired person unless a socially acceptable excuse is unavailable" (Elliot 1991, 1293).

Further research indicated that persons who are socially isolated tend to be at a much higher risk of depression. Other studies suggest that depressed persons are less likely to be involved in social activities and that even when they are they are less likely to be included in conversation or other social behaviors. This in turn leads to more social isolation and deeper depression. With these studies in mind it stands to reason that the more the experiences of physically impaired persons approach the experiences of non-physically impaired persons the better for mental health. Since LSU has a wide variety of social opportunities it stands to reason that most, if not all, physically impaired persons could find one or more outlets for social inclusion if provided with reasonable accessibility options.

### Self-Esteem

Many physically impaired persons do not “recognize it’s okay to be who we are” (McClintick 1997, 68) and as such develop self-esteem problems. Many articles that I encountered made mention of this type of behavior in a physically impaired individual. In the Journal of Psychology studies were cited which indicate that a person with physical limitations has a “constant lack of positive experiences” and that this “lack of respect from others may lead to lower self-concept” (Sing-Fai 1998, 78). Other studies suggest that in order to improve self-esteem it is necessary for the individual to become more active in the day-to-day social activities of his or her contemporaries. In order to do this a physically impaired individual needs to feel wanted by the community. Having accessible outdoor spaces at LSU that are not secondary to what everyone else uses is a beginning to making physically impaired persons feel like a part of the community at large instead of a subset of the general community.

### Stress-Illness and Social Support

Psychological barriers may contribute to stress related illnesses by contributing to depression. In a study published in the American Journal of Public Health a depressed person is more likely to suffer from the following: stroke, arthritis, angina, cognitive impairment, and hearing and vision problems. According to this study depressed subjects are “less physically active, were more likely to be unmarried, and had fewer close relatives and friends” (Phenninx 1999, 1348).

Social Isolation, which for many physically impaired individuals is a result of psychological and physical barriers, contributes to depression that may in turn contribute to other physical illnesses. The cycle of isolation, depression and illness feeds on itself and is not easily broken. When LSU chooses to continue to leave physical barriers in place it contributes to the cycle by reinforcing the psychological barriers, and hence, more social isolation.

## **Physical Barriers**

For the purpose of this thesis I am limiting my research of physical barriers to those that are present in the areas studied. This area includes the outdoor spaces directly connected to student housing and its auxiliary units such as cafeterias, coffee shops, and laundry facilities. The total outdoor space was evaluated including access routes, assembly areas and recreation areas. Not included in this study are architectural components such as doors, door handles or any portion of a facility that is not considered a landscape design problem. For the purposes of this thesis a physical barrier is any portion or component of the built outdoor environment that does not meet ADA standards.

## **Universal Design**

The term Universal Design, as defined by Ron Mace, one of its leading advocates, is simple yet elegant: “Universal design is an approach to design that incorporates products as well as building features which, to the greatest extent possible, can be used by everyone” (Preiser 2001, 1.5). I began my research into the area of Universal Design with the purchase of the book Universal Access to Outdoor Recreation: A Design Guide some years ago. This book served as my introduction to the concepts of universal design and provides valuable information on making outdoor spaces equally accessible to everyone. Later, when beginning to formulate my ideas for this thesis I used the Internet as a resource for gathering up to date information concerning the latest thinking in universal design. This lead me to the Center for Universal Design at North Carolina State University where I found the guiding principles behind universal design as well as articles on the concepts of the process. Other Internet sites, such as IDEA: The Center for Inclusive Design and Environmental Access at the University of Buffalo, also provided useful information on the universal design process.

Another resource that has been particularly useful is the Universal Design Handbook, published in 2001. It covers the subject in great depth with topics ranging from an introduction to the concepts of universal design to the future of universal design. Other books, such as Inclusive Design, Barrier Free Design and Access By Design also proved to be valuable resources for compiling a set of design recommendations for the student housing areas on LSU’s campus.

### **CHAPTER 3 PSYCHOLOGICAL BARRIERS**

This section is included to demonstrate the linkage between physical barriers and social isolation.

Psychological barriers significantly inhibit persons with mobility impairments from taking part in the daily social activities which persons without impairments take for granted. Psychological barriers are presented in a multitude of ways, one of which is the seeming lack of concern regarding the feelings of mobility-impaired persons. This can be seen in poorly designed outdoor spaces that suggest by their exclusion that certain individuals are less important. For example, two dramatically different entry experiences can be demonstrated at the Frey Computing Services Center. Unlike the fluid entry experience for a non-mobility impaired individual, the mobility-impaired individual must access the building at the rear via a ramp which passes a large open top dumpster, the building's facility maintenance area and the loading dock, then wraps around the building along a raised sidewalk all the way back to the front entrance, finally entering the building. (Fig. 3 & 4)

The Frey Building has been constructed since the ADA was passed by Congress and signed into law by then President George Bush. The building is constructed on a platform with steps as the only option at the primary entrance. Even with the building being raised several feet above ground level it was still unnecessary to build separate entrances, as ample area exists in front of the facility for one seamless entry for use by everyone.

In addition to designs that make access more difficult, a multitude of other factors contribute to psychological barriers. Among these factors are: semantics and symbolism, attitudes and behaviors, and self-concept. The following pages will discuss each of these issues so the reader may better understand why a well-designed, all-inclusive space is so important.



(Fig. 3) Main entrance to the Frey Computer Services Center. The inclusion of steps instead of a gradual slope leading into the center causes many mobility-impaired persons to have to use a secondary entrance.



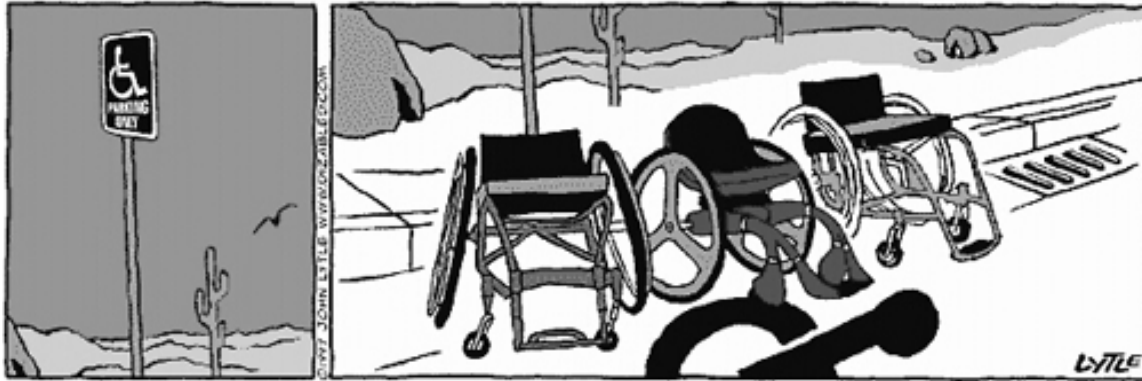
(Fig. 4) Only wheelchair accessible entrance into the Frey Computing Services Center. This photograph highlights the differences given in considering the entry experiences of mobility impaired and non-mobility impaired individuals. Not only is this entry at the rear of the building, it is aesthetically displeasing and noisy.

### **Semantics and Symbolism**

Through our use of words and symbols we convey our thoughts. The choice of the wrong word or symbol can have a negative impact on any individual. In our society we have chosen to define particular groups of people and the individuals within those groups incorrectly. Words contribute directly to putting limits on individuals. In How do you say it? Cathryn Creno states “language affects things in a lot heavier way than most people are aware of” (Creno 1992, 19). No one wants to be placed in a negative light, but how we describe a person often does just that.

The labels placed on a particular group transfers to the individuals within that group and can have life-long repercussions. Referring to an individual by a group label is much too simplistic. Lack of ability to walk does not mean a person cannot move about. Lack of eyesight does not stop a person from reading and getting around. Lack of hearing does not automatically preclude a person from joining in on a conversation. As stated by David Beaver, the “terminology a society, and subsequently an individual, utilizes should reflect correctly the equality of all its citizens, as well as being sensitive to the situation” (Beaver 1993, 4).

We must be careful when choosing our words, as it is those words that will define what we think of others and ultimately, what others think of us. Words tell the world how we think, what our perceptions are, and to a large degree, who we are. Changing the words we use will eventually change the way we think about others by changing the cognitive pathways we employ to recognize those individuals. As Beaver points out concerning a psychosocial axiom “what you think of me I will think of me, and what I think of me I will believe” (Beaver 1993, 4).



(Fig. 5) On-Line cartoon making light of signage indicating parking areas for wheelchairs [Dizabled].

The media tends to exacerbate the negative portrayals of persons with physical impairments by reinforcing the usage of stereotypical images and labels. One sample of television programs found that “a person’s disability was portrayed as the central focus of a person’s life rather than his or her behavior in occupational or social situations, regardless of the disability” (Yoshida 1990, 418). Other examples of media stereotyping of individuals with disabilities abound. “Stereotyping through the arts and literature has implicitly left its mark on society. Characters with physical disabilities and abnormalities appear in stories as pathetic children [Heidi and The Secret Garden] or as villains, hunchbacks and giants [Frankenstein, Dracula and Jack and the Beanstalk]. Dwarfs and trolls have been noted for their meandering under bridges or living alone as social outcasts, and there is gruesome evil lurking behind the mask of the Phantom of the Opera” (Furminger-Delisle 1996). Examples such as the Hunchback of Notre Dame are less dominant in contemporary media, but even subtle messages tend to reinforce negative belief structures.

As designers we are taught to conceptualize our ideas. We, as well as most everyone else, also conceptualize our words. “The concept of disability, when applied as a medical or psychological diagnosis, can subsume the culturally, socially, and historically derived identity of an individual beneath a label of pathology” (Block 2001, 27). The word disabled is a diagnosis of pathology. As such, this thesis will make references to disabilities but will not refer to persons as disabled. Instead phrases such as ‘physically impaired’ or ‘mobility impaired’ will be used.

In addition to the written word we also use iconographic symbolism to convey our thoughts. In the same way as the words we use reveal our thinking processes, these iconographic symbols convey our thoughts as designers and help to shape the thoughts of those who see them. The most widely used symbol for an accessible space portrays a perfectly erect, perfectly immobile wheelchair/human combination (Fig. 6).





(Fig. 6) Static Wheelchair symbol from the Americans with Disabilities Act Guidelines [ADAAG].

It is this type of symbol that adds to the negativity of our spoken words. Disabled refers to unable. This symbol fuses together the individual who uses a wheelchair and the wheelchair itself, furthering the notion that a physical limitation completely defines an individual. Other less static symbols would more accurately portray the use of a wheelchair for mobility purposes (Figs. 7 & 8).



(Fig. 7) Wheelchair access symbol indicating motion [Daseps].



(Fig. 8) Graphic depicting movement in a wheelchair [Daseps].

In current American culture iconic symbols have evolved to portray specific meanings and to carry specific connotations. We as designers should recognize that a symbol could be a defining factor in a person's life and strive

to make those definitions positive. LSU could contribute to an increased awareness of the distinction between physical limitations and those persons who have physical limitations by more carefully choosing the types of iconic signage used on campus.

### **Attitudes and Behavior**

Throughout the course of our lives we develop attitudes and beliefs about all manner of things. Our attitudes begin to develop very early in life and affect the way we interact with others on a daily basis. Fishbein and Ajzen define attitude as a “learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object” (Fishbein and Ajzen 1975, 6). They go on to state, “changing attitudes can be difficult. Life experiences lead to the formation of many different beliefs, which, in turn, affect attitudes. Beliefs about institutions and groups of people tend to be especially stable” (Fishbein and Ajzen 1975, 7).

“Research has shown [Bender, 1981; Amsel, 1986; Kitchin et al, 1998] that attitudes towards persons with impairments are negative and that we attribute more undesirable characteristics to them than to individuals without disabilities” (Perry 2000). With this in mind it is important that we as designers realize the importance of making the spaces we create universally accessible so that we may all experience life together. By bringing everyone together and realizing the needs of everyone to participate fully in everyday activities we can contribute to changing attitudes and behaviors.

A more complete understanding of attitudes and behaviors may encourage us to work to overcome our own developed attitudes and behaviors and be more open to the ideas of universal design, a term coined by the late Ron Mace. For instance, in a 1991 study Loden and Roesner found that the following stereotypes are often held concerning persons with impairment:

1. Physical impairment equals intellectual impairment
2. Charity cases
3. Can’t carry their own load (Loden and Roesner 1991)

In a forum discussing workplace attitudinal barriers for persons with impairments it was found that “although there may be a number of reasons for the employment problems experienced by the disabled, a recent Department of Labor Glass Ceiling Report [Braddock & Bachelder, 1994] indicates that employers’ stereotypes and attitudinal biases may be an important source of the problem. In fact, the report notes that despite data to the contrary, employers often cling to unfounded concerns about persons with impairments, including false assumptions about their job-related abilities, performance levels, absenteeism, turnover rates, and the high cost of accommodation. Interestingly, evaluation data have consistently revealed that disabled employees (a) perform as

well if not better than non-disabled employees, (b) do not have higher absenteeism or turnover rates than those without disabilities, and (c) actually have better safety records than their non-disabled counterparts [cf. Greenwood & Johnson, 1987]. Furthermore, research has shown that most job accommodations are relatively inexpensive” (Stone, 1996). Such attitudinal biases tend to exclude many persons with disabilities from the everyday activities of life as well as the workplace.

Lack of experience with impaired persons contributes to lack of understanding. Poor design contributes to lack of experience. As Ron Mace once said, “We kind of discount people. We disregard them. We think there’s something wrong with them that they can’t use the environment. They are not broken. It’s the environment that’s not adequate” (Mace, Ron. 1998). It is imperative that we design for everyone. We must think of each individual as a potential user of our designs and strive to ensure full accessibility. Doing otherwise, in my opinion, shows a biased attitude in the designer and a blatant disregard of persons with impairments. As the 1954 Supreme Court ruling in *Brown v. Board of Education* found, separate but equal is not equal.

### **Self-Concept**

Dr. Kimeron Hardin, Ph.D. describes self-concept as the compilation of messages we each receive about ourselves throughout our lifetime. These messages come from family, the media, religious institutions, our peers, the government and any other source we have contact with. Every person encounters both negative and positive messages about themselves. It is the balance and intensity of the messages that can eventually build up or chip away at a person’s self-concept and self-esteem.

For children the home and school settings provide most of the direct messages which influence self-concept. For children with impairment these messages can quickly become non-inclusive. Having to ride to school in a special bus, being excluded from sports, and being relegated to specific locations in the classroom, dining halls and even at home are but a few of the obstacles these children face. Even with all of these obstacles children with impairments remain generally happy with their lives. But as children move through adolescence and into adulthood they lose even more opportunities for participation that in turn affects their social connections, which lead to more physical problems and depression. According to a study cited by the *Toronto Star*:

Almost 50 percent of the youth were ‘very happy’ about their lives, but only 24 percent of the adults felt that way.

Only 35 percent of the adults were employed and 85 percent of those earned less than \$15,000 per year. Only 26 percent of the adults graduated from college or University, 20 percent less than the national average.

67 percent of the adults lived with their parents or siblings and almost 80 percent were single.

42 percent of the adults watched more than four hours of TV a day.

More than half did not exercise. (Toronto Star [Toronto], 27 May 2000)

This study points out the way social isolation slowly creeps into a person's life. It is often difficult for persons with impairments to break societal barriers that have traditionally seen a person with any impairment as someone who deserves pity and charity. The following chart (Depauw 2000, 361) demonstrates the differences in ways of thinking about a mobility-impaired individual.

<u>Medical Model</u>	<u>Social Minority Model</u>
Disability is equated with being defective, inferior, or less than.	Disability is equated with being different; different is not less than, it is simply being different.
A wide spectrum of biological/ psychological anomalies and deficits exists.	There is only one shared experience: social stigma.
Terminology tends to be very negative.	Terminology tends to be positive or neutral with person-first emphasized.
Discussion is about defects, problems, or characteristics.	Discussion is about individual assessment data, personal strengths, and weaknesses.
Goal is to give advice/ prescription to patient.	Goal is to empower individual to assume active role in self-actualization.
Graphics are passive.	Graphics are active.

Depauw (363) also discusses the positive aspects of inclusion for all persons regardless of impairment.

1. Opportunity to develop social skills necessary for interaction with others.
2. Opportunity to develop friendships with peers with and without disabilities.
3. Opportunity to interact with age-appropriate role models among able bodied peers.
4. Decreased isolation.
5. Increased expectations and challenge.
6. Attitude changes among peers and increased acceptance.
7. Increased appreciation of difference.
8. Greater understanding of disability rights and equity.

Respect, it is often said, has to be earned. But is that really true? Most people respect others enough to acknowledge their existence and to give a helping hand when needed without being condescending, to talk to or smile at new acquaintances in social situations. This is often not the case for a person with impairment, who is likely to be ignored altogether. As stated by Furminger-Delisle, "There are limitless testimonies of people with disabilities being underestimated on their personal, social and academic abilities. Request of assistance are often

overcompensated with an attitude that the person with the disability is absolutely incapable of accomplishing anything” (Furminger-Delisle 1996). Designing an inclusive environment will help to mitigate these types of responses by pulling everyone into the same space and allowing impaired and non-impaired persons the opportunity to get to know one another and to understand each others capabilities.

Several research studies through the years have shown a tendency for “individuals with physical disabilities to have lower self-concepts than their able-bodied counterparts {Gordon, 1965; Kapp-Simon, 1986; Lawrence & Winschel, 1973; Tam, 1991; Tam & Watkins, 1995}. There are several explanations for those findings. Physical disability acts as a negative stimulus and leads to social discrimination. According to the perceptions of the general population, being physically disabled means being stigmatized and placed in a disadvantaged social position” (Tam 1998, 78). Among the many reasons for this lowered self-concept is the profusion of physical barriers that physically impaired persons encounter as well as the negative reactions of many non-impaired individuals towards them. Often the negative reaction is not intended as hostile or harmful, but may be perceived as such. A positive self-image is an important part of any human beings overall psyche. For a person with impairment a stronger and more positive self-concept can help overcome the erroneous beliefs that other people hold. It is in this light that we need to consider all individuals when designing. Hopefully by bringing everyone into the same space at LSU as well as other sites we can help to change attitudes and make life better for everyone concerned.

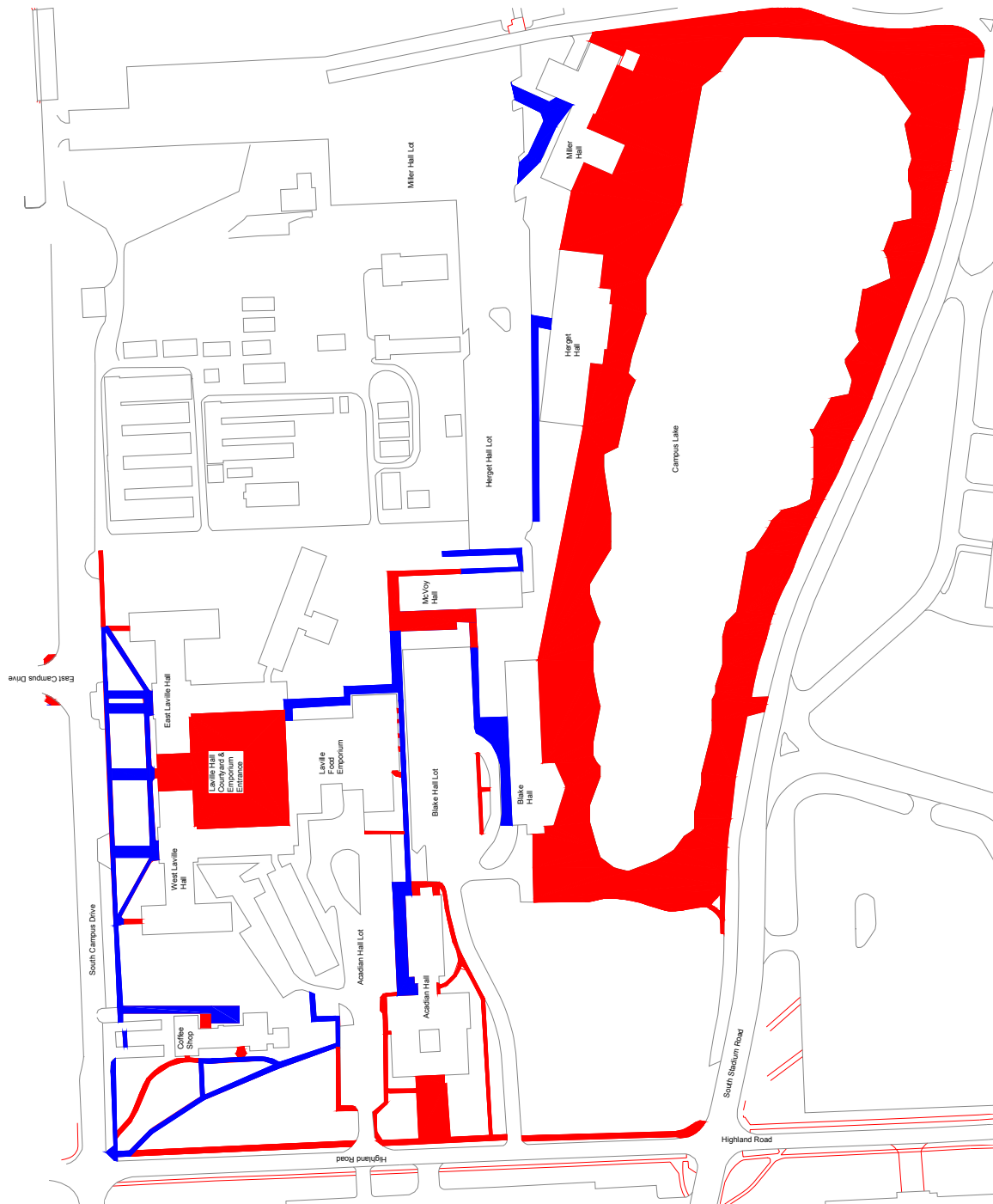
## **CHAPTER 4**

### **PHYSICAL BARRIERS IN THE HOUSING CLUSTERS: GRAPHIC EXAMPLES**

The following chapter is divided into 4 sections that are intended to graphically and descriptively highlight the obstacles encountered on a daily basis by persons with physical impairments. AutoCAD generated maps of the particular portion of campus under review accompanies all sections. The first three sections are of housing clusters: Campus Lake Cluster, Pentagon Cluster and Evangeline Circle Cluster. The fourth section, Laville Food Emporium, demonstrates the difficulty of accessing that particular cafeteria from the Campus Lake cluster. In addition to presenting physical barriers to physically impaired persons, the problems presented can also be a hazard for all users. In addition, many of the photographs depicted show a lack of aesthetic consideration.

Of the ten possible entry points for Laville Food Emporium, only one is accessible. The route to this access point is circuitous at best. If a wheelchair using student living in Laville Hall wished to dine with friends in Laville Food Emporium s/he would have to exit the Hall from the front entrance, take the sidewalk along South Campus Drive, navigate around parked cars between two curb cuts (possibly having to travel along the street itself for 40 to 50 feet) to the corner of South Campus Drive and Highland Road. At Highland Road the student would then take a left for a short distance on the sidewalk along Highland Road, then turn left diagonally in front of the French House until reaching the Acadian Hall parking lot. Then another left, and then another left, then a right to a curb cut into the parking lot. At this point the student must travel across Acadian Hall parking lot to a curb cut in front of Acadian Hall, where he or she would be able to get back on the sidewalk. After regaining the sidewalk the student would then move along the sidewalk past several more possible entry points into Laville Food Emporium, take a left at the corner of the building, travel all the way back along the side of the building to the front corner and, finally, enter. In stark contrast, an ambulatory student would walk out the back of Laville Hall, about fifteen feet under a covered walkway and into Laville Food Emporium.

## Campus Lake Housing Cluster



(Map 1) Campus Lake Housing Cluster. Blue areas indicate accessible spaces for persons with mobility impairments. Red areas indicate non-accessible spaces for persons with mobility impairments.



(Fig. 9) Improperly maintained curb cut near McVoy Hall. In addition to posing a problem for physically impaired persons, the poor drainage at this curb cut may also contribute to injury when water, debris and mud collect, and is not aesthetically pleasing.



(Fig. 10) Curb cuts that do not easily connect to each other. At certain points a small parking area interrupts connecting curb cuts, thereby forcing a wheelchair user into the street to make the connection. As can be seen in the photograph, many non-physically impaired persons cut across the median to the left of the tree. This type of desire line indicates that the access route is not satisfactory to any of its users.





(Fig. 11) Illustration of multiple curb problems; poor drainage, damaged paving materials and sidewalks that are too narrow, especially when considering the vehicular overhang above the sidewalk.



(Fig. 12) Intersection of South Campus Drive and Campus Lake Road. One curb cut exists on the housing side of Campus Lake Road but not on the opposite side of the road. No sidewalk exists along the side of the road where the curb cut is, thereby forcing most physically impaired persons into the street to access the student recreation center or student housing in the area.

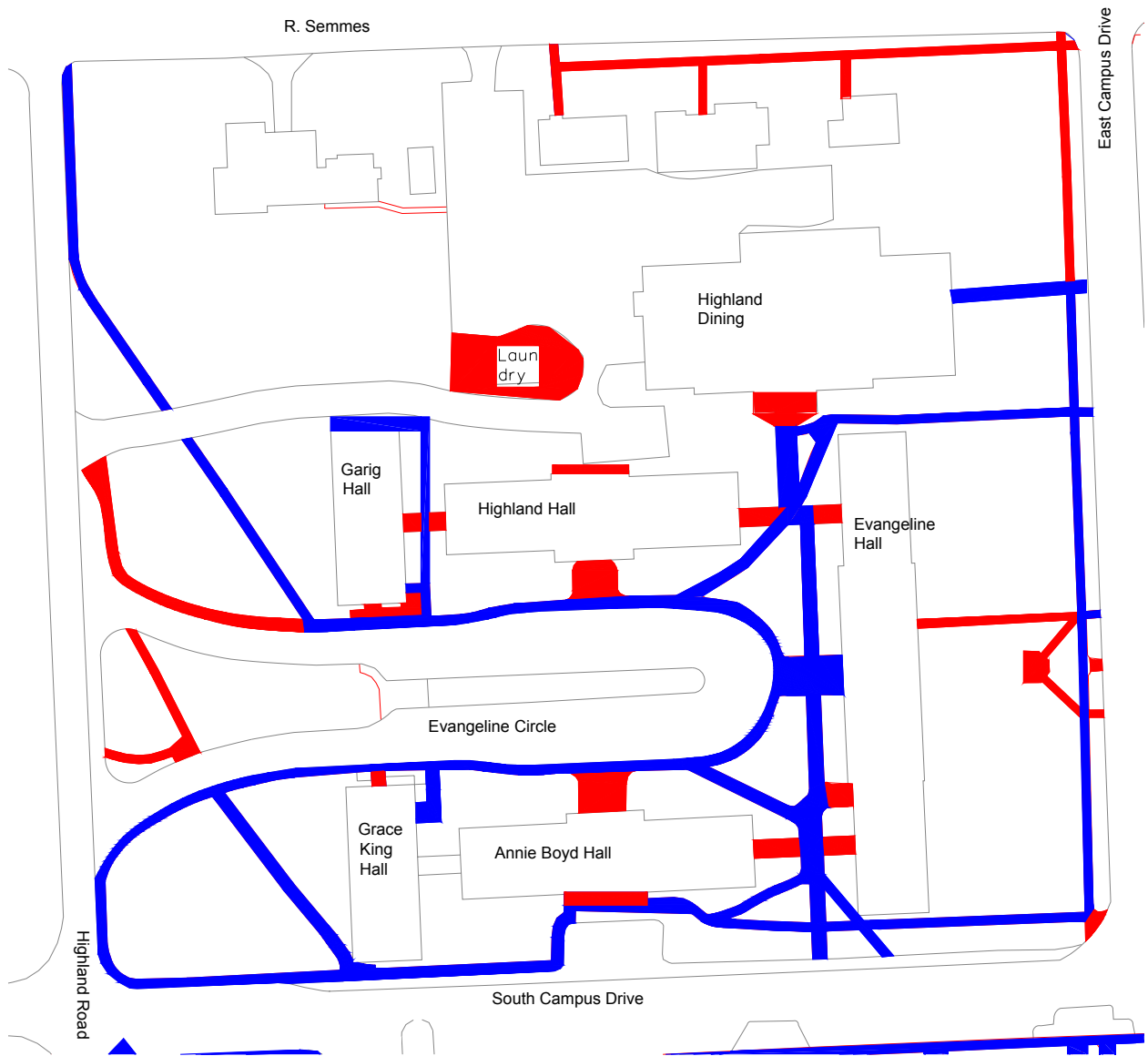


(Fig. 13) Recreation area on the student housing side of Campus Lake. This area is behind and between Herget Hall and Miller Hall. Though a concrete pad with fire pit and picnic tables is available, no provisions are made for accessing the pad. This presents a problem for all who attempt to access the area, especially after rainfall.



(Fig. 14) French House Coffee Shop in the Campus Lake housing cluster. This is the only available entrance to the coffee shop and is not accessible to many physically impaired persons. The small grade change also presents a tripping hazard for all users.

## Evangeline Circle Housing Cluster



(Map 2) Evangeline Circle Housing Cluster. Blue areas indicate accessible spaces for persons with mobility impairments. Red areas indicate non-accessible spaces for persons with mobility impairments.



(Fig. 15)



(Fig. 16)



(Fig. 17)



(Fig. 18)

(Figures 15 – 18) Intersection of Rapheal Semmes and East Campus Drive. These photographs illustrate barriers a physically impaired person encounters on a daily basis when moving around the student housing areas of campus. Only two of the four corners have curb cuts and neither of those two corners is on the Evangeline housing cluster side of East Campus Drive.



(Fig. 19)



(Fig. 20)

(Figures 19 & 20) Main bus stop on Highland Road. This area is directly in front of the Evangeline Circle housing cluster. There are no curb cuts to access the bus stop and due to grade changes the bus shelter itself is not accessible to many physically impaired individuals.



(Fig. 21)



(Fig. 22)



(Fig. 23)



(Fig. 24)

(Figures 21 – 24) Drainage, maintenance, connection and litter problems with curb cuts in the Evangeline Circle cluster of dorms. Figures 21 and 23 highlight a connection problem with the curb cuts, specifically, no curb cut on the opposite side of the street. Figures 21 – 24 illustrate paving damage and drainage issues, as well as aesthetic dilemmas.





(Fig. 25)



(Fig. 26)

(Figures 25 & 26) Automobile blocking curb cut. These photographs were taken over the course of three days during the Thanksgiving holiday break. The pictured automobile did not move from this location for the entire three days. In addition to blocking the curb cut, it had no identifying markers as an automobile that was legally allowed to park in the adjacent location. Repeated calls to both the LSU office of Parking and the LSU police went unanswered. While this is a police matter, it does illustrate one problem encountered by physically impaired persons.



(Figure 27) Curb cut that leads out of Evangeline Circle. There are no curb cuts on the opposite side of Highland Road.



(Figure 28) Newly installed curb cut leading into a secondary entrance to Grace King Hall. No reserved parking spaces are provided nearby.





(Fig. 29)



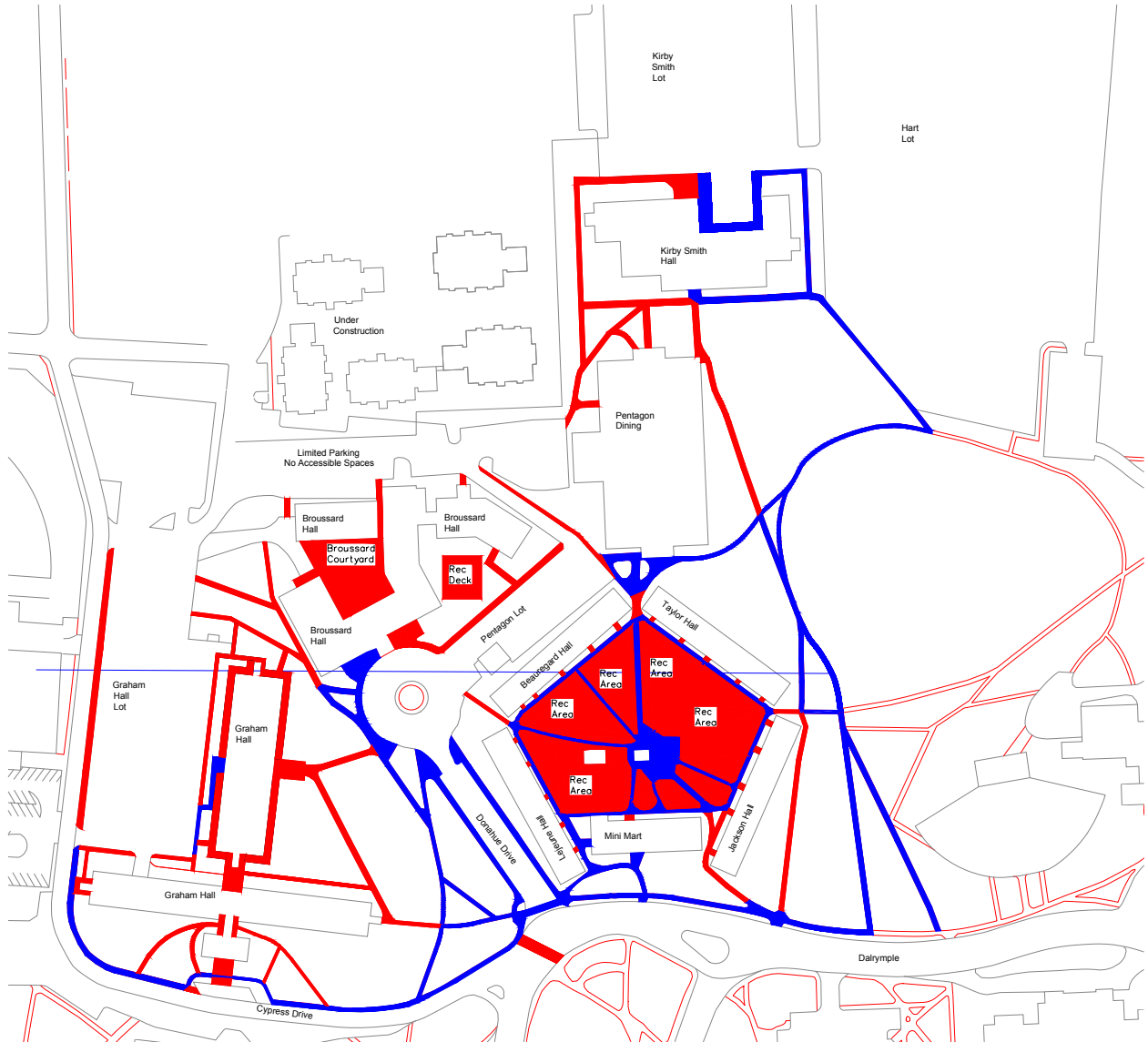
(Fig. 30)

(Figures 29 & 30) Access route in Evangeline Circle Housing Cluster. These two photographs depict the main entry point into Highland Dining Facility located in the Evangeline Circle housing cluster. Due to neglect of the access route the primary entrance is not an option for physically impaired persons, and is dangerous for others as well.



(Figure 31) Laundry facility for Evangeline Circle Housing Cluster. This building is completely inaccessible to many persons with physical impairments. The area is also in need of aesthetic improvements in order to provide a better experience for all users.

## Pentagon Housing Cluster



(Map 3) Pentagon Housing Cluster. Blue areas indicate accessible spaces for persons with mobility impairments. Red areas indicate non-accessible spaces for persons with mobility impairments.



(Fig. 32)



(Fig. 33)



(Fig. 34)

(Figures 32 – 34) Damaged sidewalks. These sidewalks, all located within the Pentagon Housing Cluster, are not accessible for many physically impaired persons due to improper maintenance, and also present a dangerous situation to all users. In addition to being a barrier and a danger, this area gives the appearance of being neglected and is therefore a less inviting space to use.



(Fig. 35)



(Fig. 36)

(Figures 35 & 36) Recreation areas. These two recreation areas in the Pentagon Housing Cluster are not accessible to all users for different reasons, but nevertheless preclude many physically impaired persons from taking part in any activities in these spaces.





(Fig. 37)



(Fig. 38)



(Fig. 39)



(Fig. 40)

(Figures 37 – 40) Curb cut problems. These four photographs illustrate both lack of curb cuts and poorly planned location of curb cuts. Figures 37 and 38 are of the same housing unit, Graham Hall, taken roughly one hundred feet apart. Oddly, the curb cut and accessible parking are directly in front of a non-accessible entrance. Figure 39 depicts one of the main crossings from the Pentagon Housing Cluster to the campus core. Figure 40 shows a lack of curb cuts in a parking area designated for a person with a medical parking permit.



(Fig. 41)



(Fig. 42)



(Fig. 43)



(Fig. 44)

(Figures 41 – 44) Blocked access routes. All of these photographs depict blocked access routes in the Pentagon Cluster of dormitories. None of the blockage is necessary for safety or maintenance. These barriers were intentionally placed by the University in order to keep sporting event fans from driving onto the green spaces. Though the protection of green spaces is important, as are the financial contributions of sports fans, those considerations should not be allowed to outweigh the right physically impaired individuals have to access routes throughout the campus.



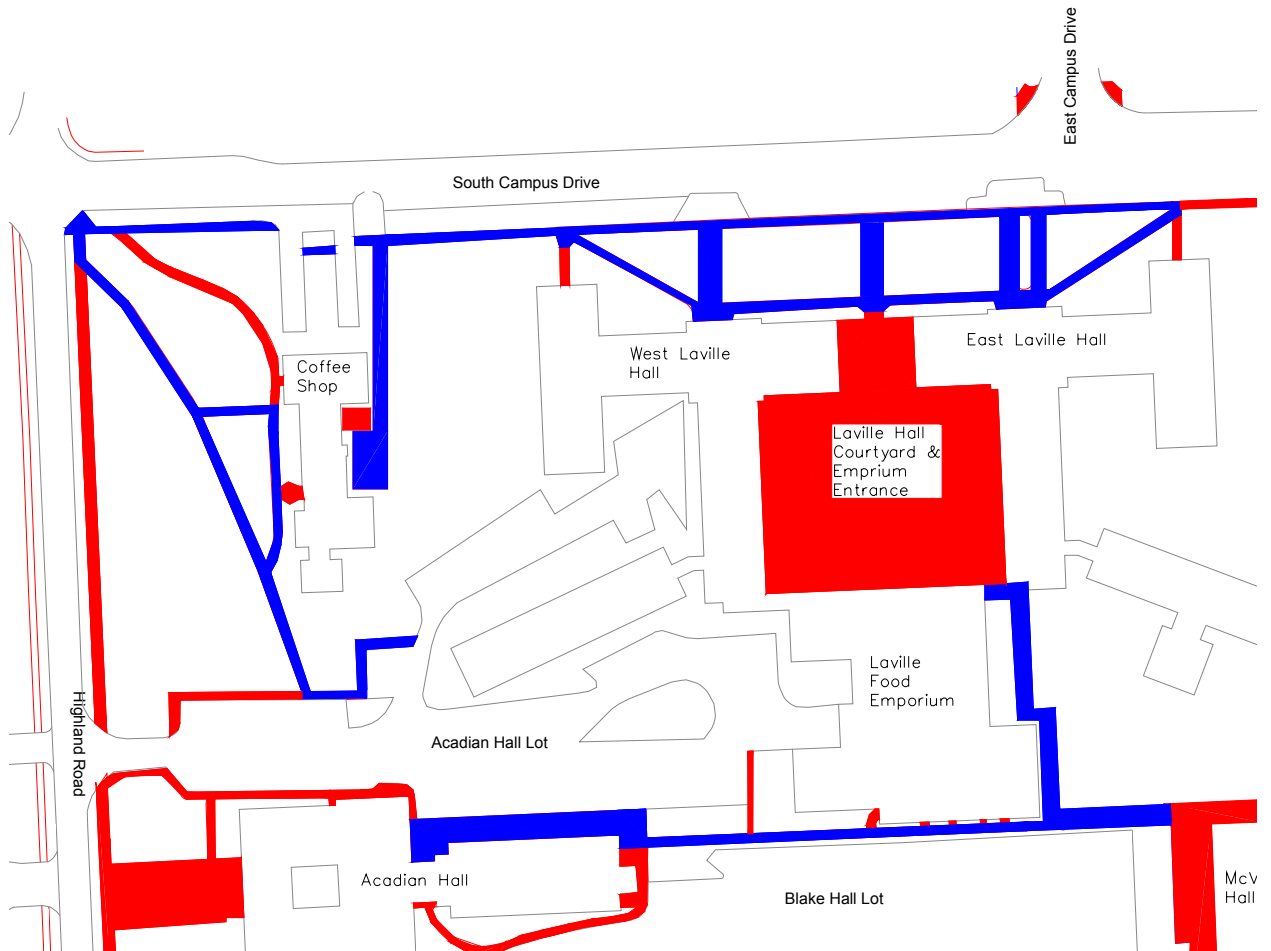
(Fig. 45) Blocked access route. This photograph depicts an electrical conduit running between Kirby Smith Hall and construction site of new residential housing. This pipe should have been raised above the access route in order to not create a barrier.



(Fig. 46) Blocked access route. This garbage can, which is blocking an access route, could just as easily and effectively be placed on the opposite side of the entry.



## Laville Food Emporium



(Map 4) Laville Food Emporium. Blue areas indicate accessible spaces for persons with mobility impairments. Red areas indicate non-accessible spaces for persons with mobility impairments.



(Fig. 47)



(Fig. 48)



(Fig. 49)



(Fig. 50)

(Figures 47 – 50) Sidewalks and curb cuts. These photographs show the condition of the sidewalks, lack of curb cuts, and drainage problems in the parking area nearest Laville Food Emporium.



(Fig. 51)



(Fig. 52)

(Figures 51 & 52) Side entrances to Laville Food Emporium



(Fig. 53)



(Fig. 54)

(Figures 53 & 54) Rear and front entrances to Laville Food Emporium.



(Fig. 55)



(Fig. 56)

(Figures 55 & 56) Main entrance into Laville Food Emporium. The courtyard is totally inaccessible to many physically impaired persons; therefore the main entrance is also inaccessible.



(Fig. 57)



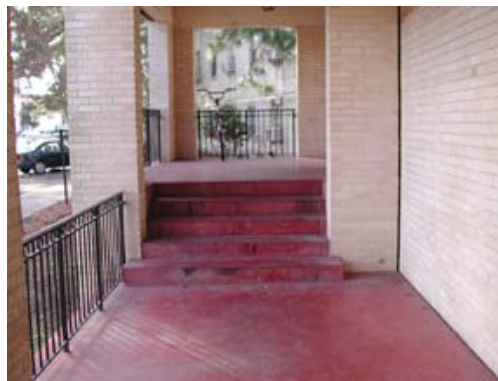
(Fig. 58)

(Figures 57 & 58) Additional side entrances into Laville Food Emporium.





(Fig. 59)



(Fig. 60)

(Figures 59 & 60) Rear and side entrances into Laville Food Emporium.



(Fig. 61)

(Figure 61) Only accessible entrance into Laville Food Emporium.

## **CHAPTER 5**

### **PHYSICAL BARRIERS IN THE HOUSING CLUSTERS: ADA SOLUTIONS**

The previous chapter demonstrated graphically some of the difficulties a person using a wheelchair would encounter in each of the three housing clusters. This chapter will discuss the steps necessary for correcting those difficulties using ADA guidelines. Though in many cases Louisiana State University is not compelled to comply with the ADA since to the age of many of the facilities precludes them from falling under the ADA. . (The sections of the ADA that are most pertinent to this thesis are included as Appendix A.) Nevertheless, I believe that LSU should strive to be a progressive, all-inclusive University. To do otherwise reflects poorly upon the institution itself, the people of the state who make its existence possible, alumni of the University and the current student body. Most importantly not striving to comply with the ADA segregates the LSU community and a segment of the University population is physically barred from being able to take part in many of the activities offered.

A few instances of accessibility difficulties not specifically addressed by the ADA were also encountered in the housing clusters. Those instances were shown graphically in the previous chapter and will also be addressed in this chapter.

#### **Curb Cuts**

Around the four clusters included in this study numerous problems associated with curb cuts were detected. Each of these problems will now be discussed and ADA solutions provided.

Problem One: Curb cuts on only one side of a street.

Solution: Refer to ADA definitions. An Accessible route is “A continuous unobstructed path connecting all accessible elements and spaces of a building or facility” (ADA 3.5 definitions). If there are only curb cuts on one side of a street then the route is not accessible. This is easily corrected by installing curb cuts on the opposite side of the street. A fully accessible intersection will have curb cuts on each side of all four corners (Figs. 62 & 63).

Problem Two: Cracked paving at curb cuts.

Solution: Once again the ADA specifies the solution to this. Anywhere along an access route there should be no sudden changes in level greater than  $\frac{1}{4}$  inch (Figs. 64 & 65). If a curb cut has a greater than  $\frac{1}{4}$  inch change in level due to breakage of the paving material then it should be repaired immediately. Repairing the sidewalks would not only make the access routes more useable for everyone, they would also make them safer for everyone.

Problem Three: Obstructed curb cuts.

Solution: One example of this can be found along the access route running beside Laville Hall and the French House. At one point the sidewalk ends with a curb cut and then continues approximately fifty feet further along at another curb cut. Unfortunately, between the curb cuts there are three parking spaces that force a wheelchair user into the street in order to regain the route. The ADA specifically states in section 4.7.8 that curb cuts “shall be protected to prevent their obstruction by parked vehicles” (ADA 4.7.8). Eliminating the three parking spaces would remove the obstruction in this area.

Problem Four: Poor drainage at curb cuts. (Not specifically addressed by the ADA.)

Solution: Drainage problems present a serious challenge at LSU due to the significant volume of annual rainfall received in the area, but several solutions are available. First, if a curb cut is not connected directly into the storm water drainage system then making that connection may possibly correct the problem. Second, in some areas it is possible to build the curb ramp up to curb height instead of cutting the curb down to street level (Fig. 66). Third, it may be necessary to direct runoff away from the curb cut into holding areas along the roadway between curb cuts.

## **Sidewalks**

Sidewalks in the area suffer from three specific problems, two of which are addressed by the ADA.

Problem One: Sidewalks that are in disrepair. The ADA specifies (4.5) that ground and floor surfaces, including sidewalks, shall be stable, firm and slip resistant. In ADA section 4.5.2 (Changes in Level) the specification reads as follows:

“Changes in level up to ¼ inch (6 cm) may be vertical and without edge treatment. Changes in level between ¼ inch and ½ inch (6 cm and 13 cm) shall be beveled with a slope no greater than 1:2. Changes in level greater than ½ inch (13 cm) shall be accomplished by means of a ramp that complies with 4.7 or 4.8” (Figs. 64 & 65).

Solution: Where possible repair the existing sidewalk to comply with ADA specifications. If this is not possible then remove the existing sidewalk, prepare the subsurface and replace the damaged sidewalk with a new one that meets ADA standards.

Problem Two: Sidewalks that are not wide enough and/or do not provide passing space. Here also the ADA specifies a solution (Figs 67 & 68). In section 4.3.4 the law states that if an accessible route has “less than 60 inches (1525 cm) clean width, then passing spaces at least 60 inches by 60 inches (1525 cm by 1525 cm) shall be located at reasonable intervals not to exceed 200 feet (61 m)” (ADA 4.3.4).

Solution: On sidewalks less than 60” wide add passing spaces as specified, or remove the existing sidewalk and replace with a wider sidewalk that meets ADA standards.

Problem three: Blocked sidewalks. Several examples of sidewalk blockage were noted in the Pentagon Cluster of dormitories.

- 1.) On the sidewalk between Kirby Smith Hall and the construction of the new student apartments a 4-inch PVC pipe, which was being used as an electrical conduit, blocked the access route (Fig. 43).
- 2.) In several locations bollards have been installed in the middle of sidewalks (Figs. 41, 42 & 44).
- 3.) At both front entry points of the Pentagon dorms large yellow steel pipes that swing out and lock into place block access (Fig. 45).

Solutions: Referencing the ADA definition of an accessible route makes it clear that putting any obstructing object in the access route renders the route non-accessible. Removing the bollards and pipes would eliminate these obstructions. Presumably the swing arm pipes and bollards are in place to prevent vehicular traffic in these locations. A better solution would seem to be fining and/or towing anyone caught driving a motorized vehicle on or across any campus sidewalk. Though this may pose a problem during home sporting events, providing a safe, enjoyable and equally accessible campus should override concerns of offending tailgaters.

### **Recreation Areas**

Problem: Many of the outdoors recreational use areas located near the housing clusters are not accessible. Examples of this are:

- 1.) A raised platform deck in the Pentagon Cluster.
- 2.) Picnic tables in the Pentagon Cluster.
- 3.) Bar-B-Que pits and picnic tables in the Campus Lake cluster.

Solution: The ADA addresses recreation areas by including them in the definition of assembly areas. (See definition in appendix B.) The ADA guidelines for assembly areas are provided in sections 4.1.2 and 4.33 which are included in appendix B. Important portions of these sections state that “At least one accessible route complying with [4.3](#) shall connect accessible buildings, accessible facilities, accessible elements, and accessible spaces that are on the same site” (Section 4.1.2 (2)), and that “Ground surfaces along accessible routes and in accessible spaces shall comply with [4.5](#).” (ADA Section 4.1.2 (4)). Providing ramps to raised areas as well as access routes and paved use areas to and around picnic tables, bar-b-que pits and waterfront areas would make these areas accessible for all students who wished to use them.



## **Ramps**

Problem: Though most buildings in the areas studied have multiple entry points, most have only one accessible entry point and that point is often in out of the way areas. Some of the facilities are simply not accessible to persons with physical impairments.

Solution: For those facilities with no accessible entrances the immediate solution is to provide access per the criteria set up in ADA section 4.3 which stipulates the criteria for accessible routes. For those facilities with poorly placed ramps a plan to make the facility more easily accessible should be developed and implemented as soon as possible.

ADA section 4.3.2 specifically states: “The accessible route shall, to the maximum extent feasible, coincide with the route for the general public” (ADA section 4.3.2 (1)). Though ‘maximum extent feasible’ can be interpreted in many ways, the goal of providing equal access for all users of the campus should help to narrow interpretation.

## **Parking**

Problem One: Though accessible parking spaces are provided they could be better located. Two examples of this can be observed in the housing clusters.

- 1.) At Grace King Hall no parking is provided near the only accessible entrance.
- 2.) At Graham Hall the accessible parking and curb cut is located roughly 75 feet from the accessible entrance.

The ADA states in 4.6.2 that “Accessible parking spaces serving a particular building shall be located on the shortest accessible route of travel from adjacent parking to an accessible entrance”. (ADA section 4.6.2)

Solution: Realign parking areas so accessible parking can be provided near the facility. Provide curb cuts as near to accessible entrances as possible. For example, at Graham Hall, parking could be provided at the curb and a new curb cut could be installed within 20 feet of the existing accessible entrance.

Problem Two: Unauthorized use of accessible parking areas.

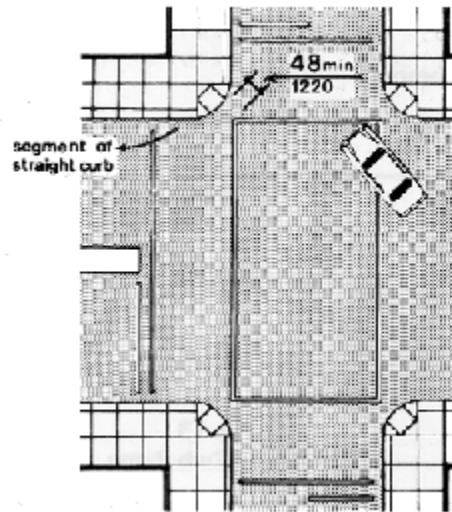
Solution: Increased educational efforts to heighten awareness concerning the difficulties that even short-term illegal use of accessible spaces can cause.

## **Public Transit**

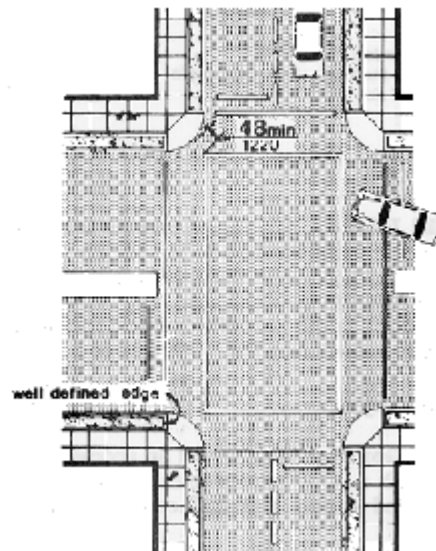
Problem: Many mass transit locations are not accessible to a student in a wheelchair. In 4.3.2 the ADA states, “At least one accessible route within the boundary of the site shall be provided from public transportation stops,

accessible parking, and accessible passenger loading zones, and public streets or sidewalks to the accessible building entrance they serve” (ADA section 4.3.2 (1)).

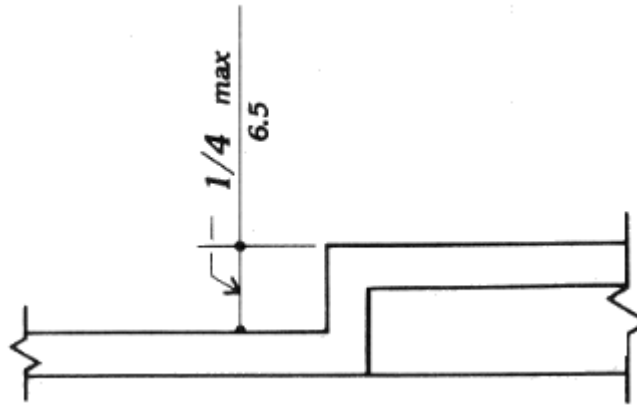
Solution: Provide curb cuts on access routes to mass transit stops and require mass transit providers to comply with current ADA regulations concerning accessibility of their vehicles.



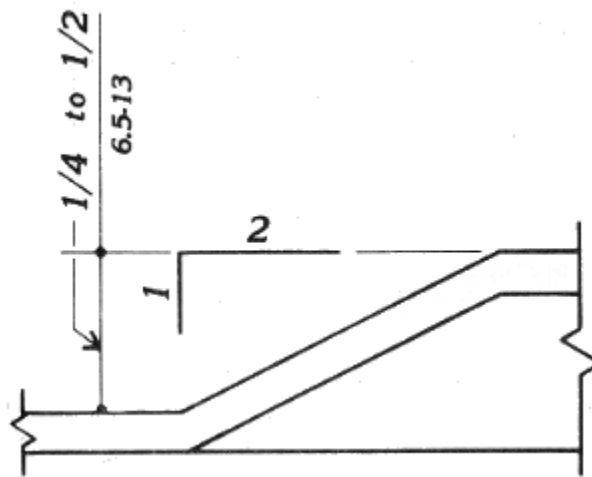
(Fig. 62) Curb Ramp with flared sides at Marked Crossings. [ADAAG Figure 15c]



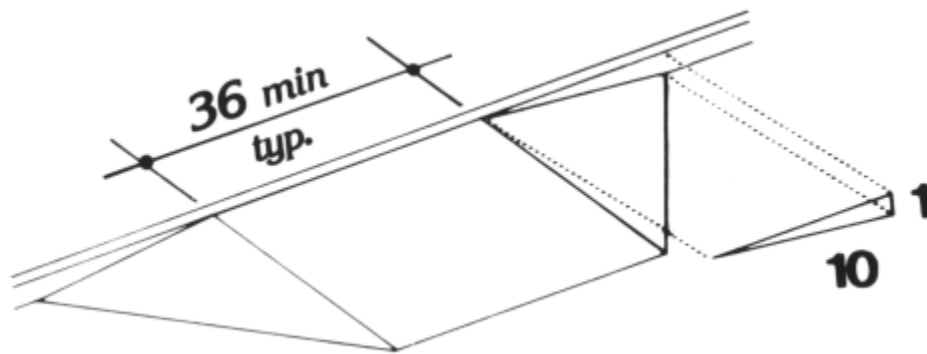
(Fig. 63) Fully sloped Curb Ramp at Marked Crossings. [ADAAG Figure 15d]



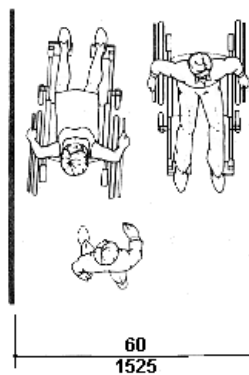
(Fig 64) Cross section drawing showing a maximum 1/4 inch vertical change in level. [ADAAG Figure 7(c)]



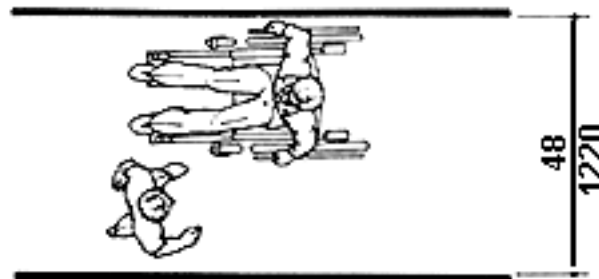
(Fig. 65) Cross section drawing showing a change in level 1/4 to 1/2 inch high with a 1:2 slope. [ADAAG Figure 7(d)]



(Fig. 66) Built up curb ramp. A built-up curb ramp extends outward from the curb and slopes to the ground surface. The sides must also be tapered from the ramp surface to the ground, with a maximum slope of 1:10, so that there are no drop-offs along the edges. [ADAAG Figure 13 Built-Up Curb Ramp.]



(Fig. 67) Minimum clear width for passage of two wheelchairs is shown to be 60 inches minimum. [ADAAG Figure 2]



(Fig. 68) Minimum Passage Width for One Wheelchair and One Ambulatory Person. [ADA Figure A1]

## **CHAPTER 6**

### **REMOVAL OF PSYCHOLOGICAL BARRIERS THROUGH THE APPLICATION OF UNIVERSAL DESIGN IN THE LSU HOUSING CLUSTERS**

Many of the causes and of effects of psychological barriers have been discussed earlier in this thesis. This chapter will discuss how it is possible to remove many of those psychological barriers through the removal of physical barriers and the integration of all users into one space. Simply removing physical barriers will not eliminate all of the psychological barriers. Removal of the physical barriers is only a portion of the process.

The ultimate goal in the implementation of Universal Design is to make spaces usable by the entire population. Our designs should respect every individual's integrity and right to pursue their hopes, dreams and desires. In the LSU housing clusters many of the physical barriers discussed could be corrected without making the spaces universally usable. But with careful design consideration many of those same spaces could be made universally accessible.

The overall quality of the experience can be enhanced with the implementation of Universal Design. An access route that is easily usable by a person with mobility impairment is also easily usable by non-mobility impaired individuals. Well-designed and maintained spaces provide an enjoyable experience for all users. And though many persons may not reflect on the psychological impact that segregated spaces has on all users it nevertheless does have an impact. Lack of direct contact with certain portions of the population makes us all less likely to understand how to interact with the segregated individuals. But when everyone uses the same spaces, the same access routes and so forth, we begin to develop a realistic understanding of the individuals that we have up until that point not been associated with in many everyday activities.

Everyone should feel that everything possible is being done in order to make the campus an inclusive experience. Much progress has been made in making the University a racially diverse experience, to the benefit of everyone, now we need to make as great of strides in making the experience inclusive of persons with mobility impairments. Not only should we make everything accessible, it should be done in such a way that no one is left feeling like a second class citizen. All-inclusive access is the desired goal, design or redesign spaces so that barriers cease to exist to the greatest degree possible is one step toward that goal.

No one wants to be treated as though his or her presence in a space is less important than anyone else. Yet when we design a space which provides a grand entrance, with beautiful landscaping for one segment of the population and then provide an access route past garbage dumpsters, building facility areas and so on for another

segment of the population, we are in essence telling them that their presence is of less importance to us. Such design is unfair to everyone since it assumes that persons without mobility impairments do not care about persons with mobility impairments, and that persons with mobility impairments should just be grateful to be given any access at all.

### **Quality of Experience Recommendations**

This section addresses a specific scenario within the LSU Housing Clusters that, if implemented, would bring that space much closer to universal accessibility. This scenario pertains to recreation areas and access routes. I choose this example with the idea in mind that these recommendations are applicable to other areas within the Housing Clusters.

#### Campus Lake Waterfront

The Campus Lake Housing Cluster has within its boundaries a very nice amenity, that being Campus Lake. Unfortunately, this area is underused by everyone due to lack of recreational amenities. The area also presents the problem of having no accessible routes to the waterfront or to the picnic tables and fire pits at all. The area is located directly behind two housing units that serve students with mobility impairments. Large trees provide shade and ducks play in the water. It is, overall, a very pleasant space to be in and could and should be used more for recreation, relaxation and as a place to study and contemplate. The grade from the parking area to the waterfront is such that an access path would not necessarily need to be highly circuitous in order to be universally accessible. The application of Universal Design concepts and principles would provide a space for everyone to use and enjoy. It is important to remember that Universal Design is for the betterment of all users, impaired and non-impaired alike.

#### Universal Design Applied to the Waterfront

Starting with the existing access routes along the parking area that serves two housing units and is nearest the waterfront the access route should be widened and repaired where breakage has begun to occur. Additional access routes should be installed that lead from the parking area into the recreational area. These access routes should be circuitous enough to make walking or navigating a wheelchair along them comfortable, avoiding grades steep enough to require ramped areas and platforms. There is sufficient room to achieve this goal in the space. Additional secondary access routes leading directly to assembly areas and to the waterfront should also be installed.

The access route should also include such amenities along its path as waste receptacles, resting areas, and emergency telephones. All of these amenities should be positioned in such a way as to not interfere with the flow of pedestrian traffic, but at the same time provide ease of use for all users. For example, waste receptacles should be

positioned in a pullout area along the access route and be not taller than 36 inches. Emergency telephones should also be placed in a similar manner within the recreation area. Telephones should be easily usable by a seated individual, but not so low as to be inconvenient to a standing individual. Sufficient lighting should also be included in the recreation area and along the access route. Personal safety concerns require adequate lighting, but that lighting should not be so bright as to become intrusive when using the space.

If drainage grates are necessary along the access route then they should be placed perpendicular to the dominant direction of travel and have openings no greater than ½ inch. Seating areas along the access route should also be provided and should, in addition to providing seating for walking individuals, provide adequate space on either end of the bench or benches so that an individual using a wheelchair can position themselves beside the bench. Benches should also have backs and armrests for the comfort of all users.

Assembly areas within the recreation area should also be provided and connected to the main recreation area access path with adjoining access paths. The assembly areas should have picnic tables, grilling areas and waste receptacles. Picnic tables should be designed so that an individual with mobility impairments and using a wheelchair can have equal selection of seating as everyone else. To accomplish this the picnic table can be built with overhanging areas at either end and on either side. This would allow a person using a wheelchair to position themselves in the location of their choice. Waste receptacles should be placed alongside the paved surface of the assembly area so that all users may access it.

Grilling areas should be placed at least four feet from any other element in the assembly area to ensure the safety of all users and to allow for turning of wheelchairs around the grill. Pedestal grills should be used and be approachable from all sides. Any movable components such as the cooking surface or front closure device should be easily operable using one hand and should require a minimum of force and movement to operate.

The lakefront itself should be approachable from the main access path and possible from some or all of the assembly areas. Paved areas should be provided near the lakefront with seating and seating areas available for all users. These paved areas should end near enough to the edge of the lake that all users may enjoy the water and waterfowl. Edge protection should be provided so that no individual will accidentally slip or roll into the water.

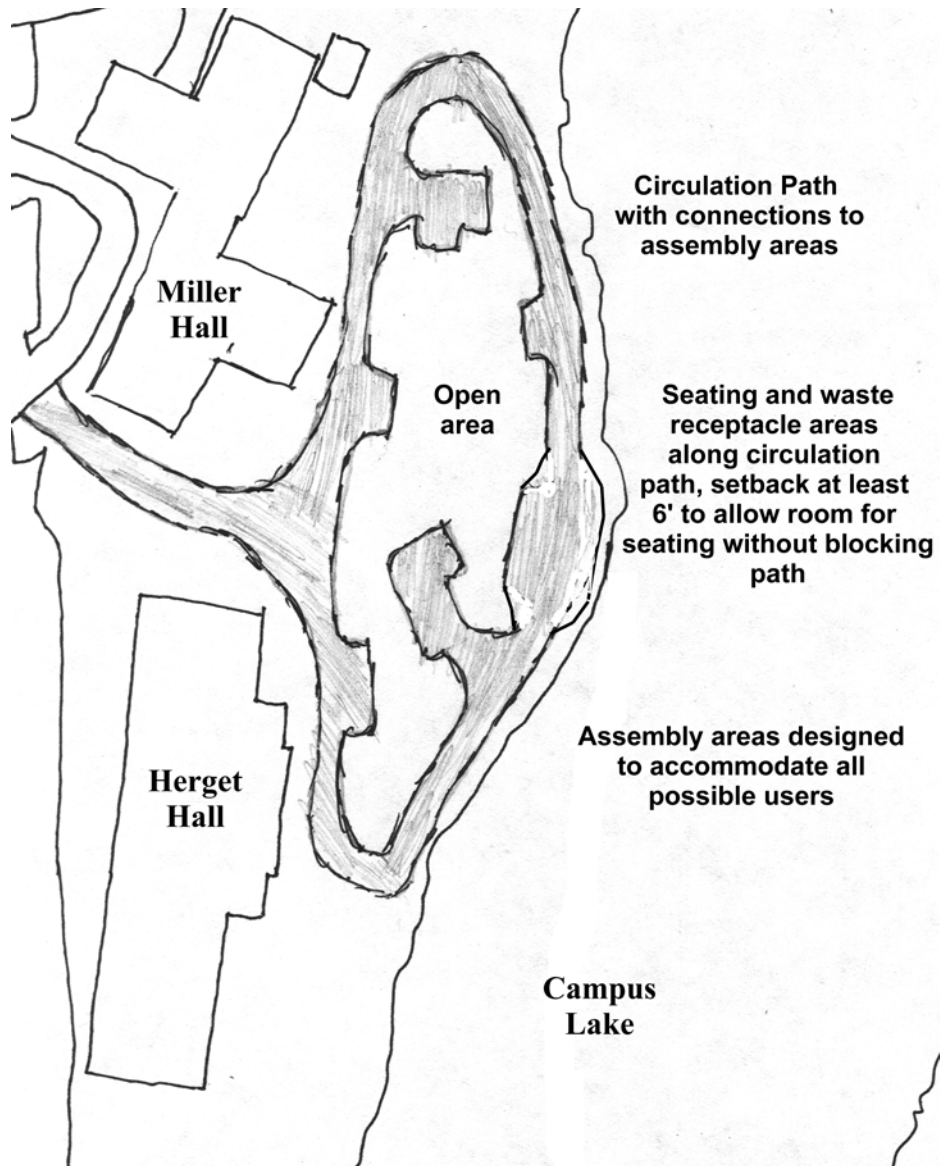
If this area were redesigned using the above recommendations it would provide a space that everyone could use and enjoy on an equal basis. It would also provide a space where persons who do not usually intermingle could have the opportunity to do so.

## **Two Examples of Universally Designed Spaces**

The Franklin Delano Roosevelt Memorial, Washington D.C. and The Audubon Aquarium of the Americas, New Orleans, Louisiana have both been lauded for the use of Universal Design Concepts in the planning and construction stages of their development. Below are photographic examples of the universal accessibility of both of these spaces. The use of Universal Design Principles in both of these spaces allows use by a wide range of individuals, with an equally wide range of abilities.

Both of these spaces share common characteristics that make them enjoyable experiences for all users. The spaces are designed in such a way that everyone uses the same access routes, has nearly identical access to the features of the sites and can explore the sites at their own pace without feeling that they are blocking anyone else's views or hindering others experience.

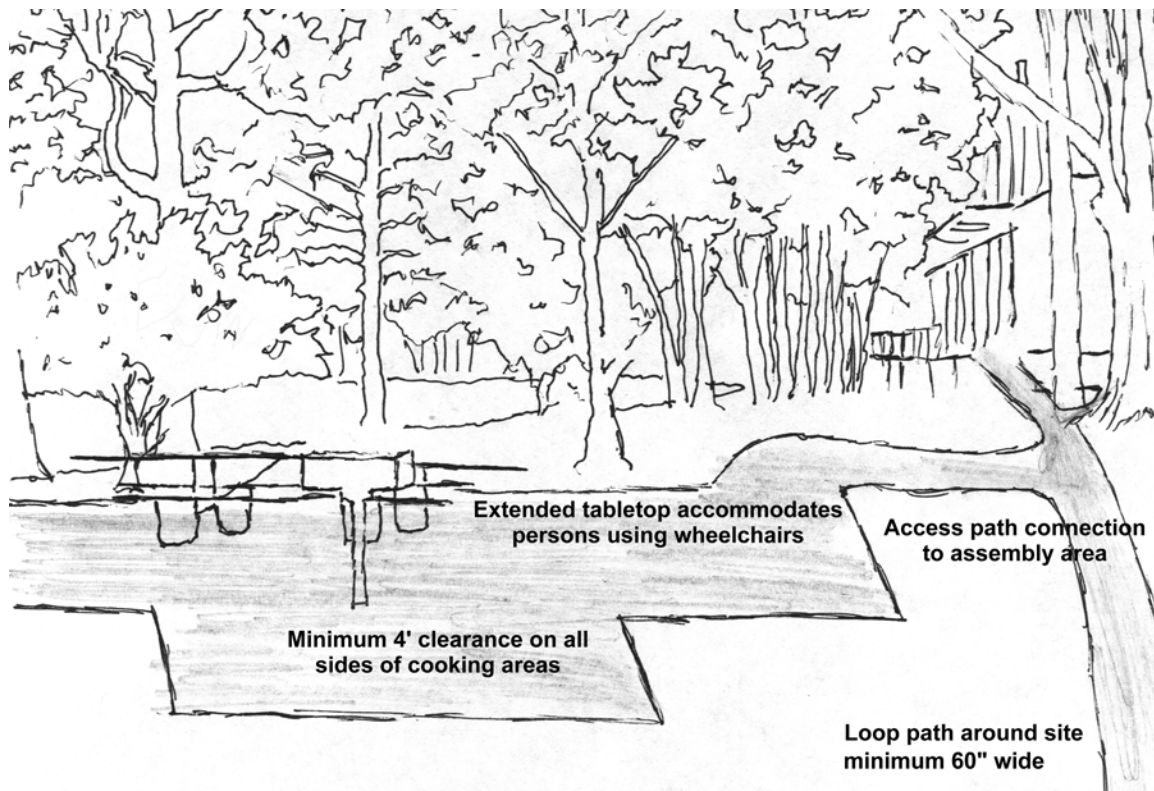




(Fig. 68a) Plan drawing for campus lake recreation area



(Fig. 68b) Accessible picnic table, Chickasaw National Recreation Area



(Fig. 68c) Waterfront Assembly Area



(Fig. 68d) Waterfront use area, Three Rivers Park District.



(Fig. 69) Waterwall in FDR Memorial. Note that there is nothing blocking views and that the area is approachable by everyone.



(Fig. 70)



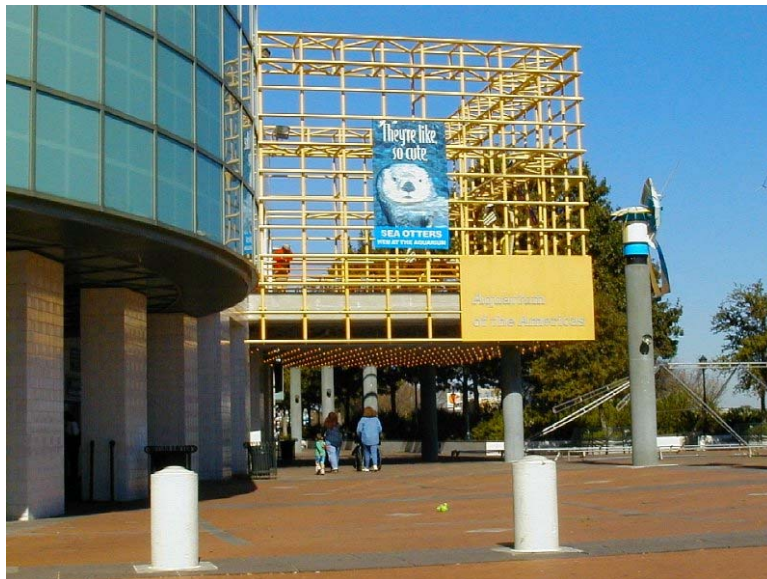
(Fig. 71)

(Figures 70 & 71) FDR Memorial. These two photographs of different rooms within the FDR Memorial show how the areas within the site are accessible to everyone. The positioning of the elements allows all users to approach, touch, and interact with the memorial.





(Fig. 72) Shared entry experience into FDR Memorial



(Fig. 73) Entry Experience into the Audubon Aquarium of the Americas



(Fig. 74) Audubon Aquarium. This photograph illustrates one of the fish tanks in the Audubon Aquarium of the Americas. All Users are surrounded by tropical fishes and are able to enjoy the experience at their leisure. Note that the descriptive displays are at a level that everyone can access.



(Fig. 75) Audubon Aquarium. This photo, also inside the Audubon Aquarium of the Americas, is illustrative of the wide access aisles and low viewing areas experienced throughout the space.



(Fig. 76) Outside view of the Audubon Aquarium. The promenade, located at crescent of the Mississippi river allows all users the chance to stroll about and enjoy the sights and sounds of the Mississippi river equally.



## **CHAPTER 7**

### **PHYSICAL BARRIERS IN THE HOUSING CLUSTERS: UNIVERSAL DESIGN SOLUTIONS**

What, exactly, is Universal Design. To answer that I defer to the Center for Universal Design at North Carolina State University: Universal Design is “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (NCSU). In addition to this eloquent definition the Center for Universal Design also provides the seven guiding principles of Universal Design:

Principle One: Equitable Use – The design is useful and marketable to people with diverse abilities.

#### **GUIDELINES**

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

Principle Two: Flexibility in Use – The design accommodates a wide range of individual preferences and abilities.

#### **GUIDELINES**

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

Principle Three: Simple and Intuitive Use – Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

#### **GUIDELINES**

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting and feedback during and after task completion.

Principle Four: Perceptible Information – The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

#### **GUIDELINES**

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Provide adequate contrast between essential information and its surroundings.



- Maximize "legibility" of essential information.
- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Principle Five: Tolerance of Error – The design minimizes hazards and the adverse consequences of accidental or unintended actions.

#### GUIDELINES

- Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- Provide warnings of hazards and errors.
- Provide fail safe features.

Principle Six: Low Physical Effort – The design can be used efficiently and comfortably and with a minimum of fatigue.

#### GUIDELINES

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort

Principle Seven: Size and Space for Approach and Use – Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

#### GUIDELINES

- Provide a clear line of sight to important elements for any seated or standing user.
- Make reach to all components comfortable for any seated or standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistive devices or personal assistance.  
(NCSU)

The American Society of Landscape Architects (ASLA) also promotes Universal Design. The following statement from the ASLA provides our own rationale for using a Universal Design approach. (Policy statement taken from the ASLA website in relation to Universal design.)

#### **Policy Statement**

The American Society of Landscape Architects (ASLA) believes the natural and built environment should be accessible and usable by all people. ASLA also believes it is the inherent right of all people to develop their economic, social and personal potential through equal or appropriate access to the natural and built environment. The Society believes that the principles of universal design are essential in the design process for creating environments that can be used and enjoyed by people of all ages and abilities, assuring that they may attain a similar quality of life.

## **Rationale**

Universal design differs from accessible design in that it is inclusive rather than exclusive and provides for designs that accommodate the full range of physical limitations as well as the able bodied; integrates the accommodation of the disabled within the basic design concept of the facility; and avoids special places based on abilities.

In spite of legislation relating to accessibility dating from the 1960's, the physical environment of our communities continues to present barriers to access and use by people with disabilities. Accessibility to all areas of the environment is fundamental to each person's quality of life and ability to fully participate as independent and active members of the community. The response to accessibility requirements is often merely standard driven, resulting in segregated facilities not meeting the level of aesthetics of other site features and lacking creativity and flexibility, thereby paradoxically limiting opportunities for both the disabled and able bodied. Through the application of the principles of universal design, barriers can be removed from existing facilities and new barrier free facilities can be constructed so that accessible features are an expected part of every place, and become an interwoven part of every facility, enhancing opportunities for the full range of users.

The Society believes that the following actions are necessary to ensure the complete application of universal design:

1. Research which will enhance and refine the body of knowledge regarding actual requirements and methods for environmental accessibility and usability and their integration into the fabric of the site.
2. The development of comprehensive environmental standards by which specific actions may be implemented, and desired objectives achieved.
3. Education of the general public on the basic concepts of universal design and its positive impact on the utilization of public facilities.
4. Basic core professional programs and continuing education on universal design for all design professionals responsible for the design of natural and built environments.
5. Education of governmental agency personnel responsible for the uniform interpretation and enforcement of standards, guidelines or regulations. (ASLA)

As Landscape Architects it is our responsibility to address the needs and wants of all users of a space. We must study to site thoroughly to determine its historic significance, the cultural implications of changes we suggest, the adaptability of the site to change, the feasibility of our ideas, the economics of our designs, and the aesthetic qualities of the spaces we design. We must endeavor to create spaces that are inclusive to as broad a range of persons as possible while delivering a pleasing experience for everyone. We must also be cognizant of the changes in the demographic nature of the population we serve. In the beginning of the last century the average lifespan was 47 years, and very few persons who sustained spinal injuries or contracted serious illnesses survived them. In 2003 the average lifespan of Americans is 76 years and our technological and medical advances have made living through major injury or serious illness much more likely. As such, the population that we serve has an enormous range of needs and desires. Failing to address these issues will render our designs obsolete, or at best, unused by a large percentage of the population.

In the following sections I will address several areas of concern in the outdoor spaces associated with the housing clusters on LSU's campus. The Universal Design recommendations I make are in some cases a significant

departure from what is the norm on our campus. In other cases relatively little change is necessary to accommodate a much broader range of our populace.

### **Curb Cuts**

In addition to a serious lack of curb cuts in the proper locations, LSU also has problems with drainage in and around many of the curb cuts near the housing clusters. A possible solution to this is to make the pedestrian access routes smooth, continuous plans. Doing so would serve multiple functions: The access route would no longer pose a hazardous tripping situation for anyone since dips, cracks and flooding problems would be eliminated; persons of all ability levels would be able to use and enjoy access around campus; in all but the heaviest of rainfalls, drainage would no longer be an issue; raising the surface level at pedestrian/vehicle crossing would slow vehicular traffic, thereby making crossings safer for everyone. The figures below provide examples of how this can be accomplished at crossings in parking areas, across streets and at intersections.

Figure 77 was taken in the parking area nearest Laville Food Emporium several days after rainfall. Figure 78 is the same photograph that has been touched up to show a continuous pedestrian access route. Since this is a low spot where runoff collects, running a continuous access route would serve to move the water away from the access route, in addition, by raising the entire crossing above grade level, it also serves to slow traffic, which contributes to making pedestrian use a more pleasurable experience. Another important factor is the aesthetic difference between the left and right examples. A direct connection to the storm drainage system via storm grates on either end of both sides would move the water away from this area.

Figure 79 is a photograph of the access route along South Campus Drive. The access route has two curb cuts at this point. One is in the foreground of the photograph, the second curb cuts is directly in front of the van in the upper right corner. Between these two curb cuts there are three parking spaces that are occupied during class times. As can be seen in figure 79, most students prefer to cross the median instead of moving into the street. For many physically impaired students crossing the median is not possible, therefore, they must move into the street to regain the access route. Making the access route a continuous plan and rerouting it across the median would make this crossing safer and more enjoyable for everyone, as well as making it fully accessible (fig. 80). Adding vegetation would also serve to add to the areas aesthetic appeal.

Some areas in the housing clusters have a significant lack of curb cuts. Figure 81 shows one such area along South Campus Drive. Students who live in the Campus Lake Housing Cluster use this access route to go to the Student Recreation Center and to visit other housing facilities in this cluster. For physically impaired students a lack

of curb cuts may well prevent a trip in either of these directions. Once again, a continuous plan access route (fig. 82) would provide equal access to these areas and also help to slow traffic at the intersection of South Campus Drive and Campus Lake Drive. In addition to raising the pedestrian crossing, a five-foot wide sidewalk along either side of Campus Lake Road would make the housing units to the rear of the cluster accessible to or from South Campus Drive.

### **Access Routes**

Many of the access routes in the housing clusters are not fully accessible. The main reasons for the lack of accessibility along the routes, in addition to the aforementioned curb cuts, are sidewalks that are too narrow and/or sidewalks that do not provide passing spaces; sidewalks that have large cracks and holes; and sidewalks that have been intentionally blocked.

Certain access routes on campus have only recently been made inaccessible by the placement of bollards in the center of the routes (fig. 84). Presumably this was done in order to prevent vehicular traffic from using these routes to access non-vehicular oriented portions of the campus during large sporting events. Unfortunately the University is not only keeping cars and trucks out of these areas, it is also preventing many physically impaired persons out of the areas. By placing bollards in these locations the University has shown a serious lack of concern for certain members of its community. Others methods, including fining and towing vehicles that are driven or parked in non-vehicular areas, would help to prevent such use of these areas. Or, if the University feels that the bollards are an absolute necessity, then one bollard should be placed on each side of the access route. Planting large shrubs and/or trees in these areas would not only help to prevent vehicular traffic, but would also serve to beautify these areas (fig. 85). There are many options to placing bollards in access routes. For the sake of equal access, these bollards should be removed immediately.

The main bus stop and shelter along Highland Road is not at all accessible to many persons with physical limitations. There are no curb cuts to access the area, and the shelter itself is built up on a platform that also precludes certain individuals from using it (fig. 86). This bus stop consist of a pullout along Highland Road, a sidewalk and the shelter. There is ample room at this location to provide a fully accessible transit stop and shelter. The pullout area could be built up instead of down and the shelter could be lowered to the same grade, providing a fully accessible mass transit station (fig. 87).

Figure 88 is a photograph of a housing cluster laundry facility. The building, grounds and parking area around this facility have the appearance of having been neglected for quite some time. In addition to the very

displeasing aesthetics of the facility, it is not accessible to many physically impaired persons. The ground around this facility is relatively flat and would pose little problem in converting it to a fully accessible space. Eliminating of the curb in front of the building and replacing it with a gently sloping entry would allow access to almost everyone, and planting some trees, shrubs, and grasses would vastly improve the overall appearance of the facility (fig. 89).

Another easily corrected situation is the seemingly odd placement of parking and/or entryways for persons with physical limitations. Figure 90 shows the existing entrance into Graham Hall (Pentagon Housing Cluster) for persons with physical limitation. Oddly, there is no parking provided nearby for these persons, nor is the curb cut located in front of the entry ramp. Figure 91 shows how simply placing the curb cut and reserved parking near the entry ramp, while not providing a truly equal entry experience, could help with the entry experience for persons with physical limitations since the existing ramp into Graham Hall is also on the front of the building and the ramp leads directly to the front door.

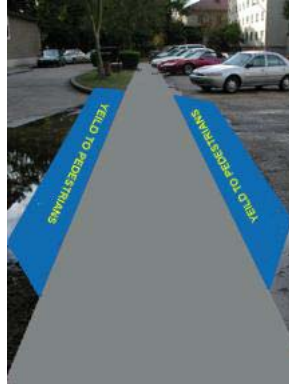
### **Outdoor Recreation**

Outdoor recreation areas in the housing clusters are usually not accessible to persons with physical limitation. Simple modifications would take care of these issues in several instances, other areas would require a complete redesign in order to become fully accessible. Below are three examples of recreation areas that are not accessible and possible solutions to make them fully accessible.

Outdoor recreational areas near the Housing Clusters are usually not accessible to persons with physical limitations (figs. 84, 86 & 88). A lack of paved access routes to the recreation areas limits who can use them, and often limits use by anyone due to muddy situations after rainfall. In most cases simply providing a smooth, continuous access route would make these areas accessible to everyone (fig. 93). In some instances a paved section in the recreational area may also be necessary to provide recreational opportunities to persons with physical limitations, but would also allow use by everyone after inclement weather conditions (fig. 95). Still other areas are in need of complete redesign in order to allow equal access. The recreation deck in the Pentagon Housing Cluster (fig. 96) is one such location. Removing the existing wooden deck and replacing it with a leveled and paved area would allow persons of every physical ability use (Fig. 97).



(Fig. 77) Curb Cut Near Laville Food Emporium.



(Fig. 78) Figure 77 modified.



(Fig. 79) Curb Cuts in access route along South Campus Drive.



(Figure 80) Figure 79 modified.



(Fig. 81) Lack of curb cuts at intersection of South Campus Drive and Campus Lake Road.



(Fig. 82) Figure 81 modified.

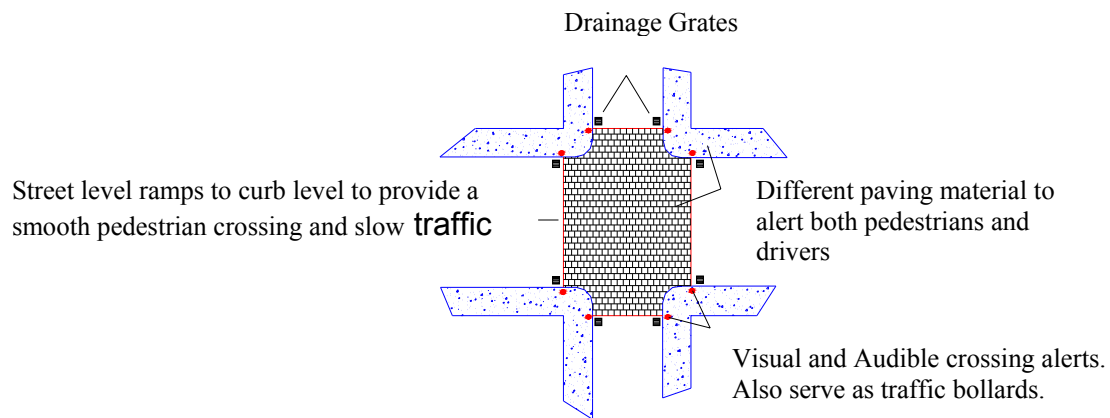


Figure 83: Plan view of 4-way intersection with raised pedestrian access



(Fig. 84) Bollard in access route in Pentagon Housing Cluster.



(Fig. 85) Figure 84 modified.





(Fig. 86) Bus stop on Highland Road.



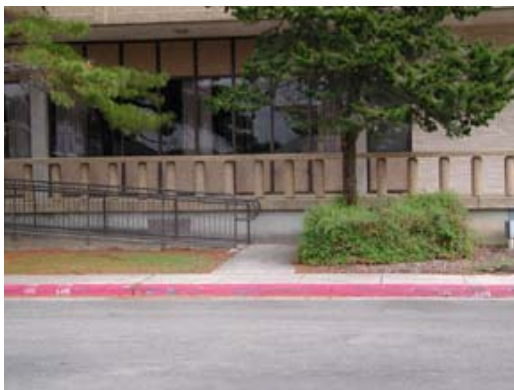
(Fig. 87) Figure 86 modified.



(Fig. 88) Laundry facility in Campus Lake Housing Cluster.



(Fig. 89) Figure 88 modified.



(Fig. 90) Lack of curb cut and reserved parking near Graham Hall accessible entrance.



(Fig. 91) Figure 90 modified.





(Fig. 92) Recreation area in Campus Lake Housing Cluster.



(Fig. 93) Figure 92 modified.



(Fig. 94) Recreation area in Pentagon Housing Cluster.



(Fig. 95) Figure 94 modified.



(Fig. 96) Recreation Deck in Pentagon Housing Cluster.



(Fig. 97) Figure 96 modified.

## **CHAPTER 8**

### **CONCLUSIONS AND RECOMMENDATIONS**

Louisiana State University has a responsibility to provide all of the people who wish to attend the University or to work at the University with full and equal access. Failure to do so results in certain portions of the population being excluded from some or all of the functions of the University. Through the research conducted for this thesis I have concluded that even meeting the minimum standards of the ADA does not provide many people with the access they want and deserve. Only by creating a fully accessible campus will LSU be able to meet those needs and desires.

Inclusive spaces provide everyone with the opportunities that they deserve. We all benefit from inclusion, we are able to make new friends, enjoy well designed spaces, experience what the University has to offer and meet the challenges that life has to offer on a more equal basis. Whenever any of us are not given the same opportunities as everyone else, we are being discriminated against, and discrimination, no matter what the reason for it, is abhorrent.

Though becoming fully accessible will not happen overnight, neither should it be sidelined or put on the back burner. Even though becoming fully accessible will have some economic cost, it is the right thing to do for everyone. Not striving to become fully accessible also has economic cost through lost revenue to the University and lost productivity of the citizens the University serves. Other cost, such as emotional stress and social isolation may also result from failure to become fully accessible as well. In addition, LSU will be among only a handful of Universities nationwide that is fully accessible whenever this goal is reached, putting it in a narrow and elite category.

As socio-cultural and technological advances move toward a much broader recognition that a person with physical limitations has as much to offer society as anyone else, so does the realization that our designed landscapes often prevent an inclusive experience. When we fail to design our outdoor spaces for use by everyone we not only exclude a large and growing segment of the population, we also deny everyone the opportunity to meet those who are excluded. As designers we need to expand our concepts of physical limitation so that we may more readily understand how many people we exclude when we do not design our spaces for inclusiveness.

The number of people with physical limitations, while quite large in and of itself, does not give us an accurate assessment of the number of people excluded. We must ask ourselves 'Would I go somewhere for a relaxing visit without the person I most love?' Would I choose to leave my partner on the sideline while I experienced

something beautiful?’ When we design spaces why would we not do it to be as inclusive as possible? Certainly we cannot claim that it is because we are unaware of the need. So why then do some designers persist in designing non-inclusive outdoor spaces? It is my hope that the answer is not that the space looks or flows better, or anything of that sort, for if a designer cannot create spaces without excluding large numbers of people, then I fear that they are not trying very hard.

The objectives of this thesis were fourfold, first to provide a thorough assessment of the physical barriers a person with mobility impairment may encounter within the housing clusters examined. Second, to examine possible psychological barriers which may be resultant of the physical barriers. Third, to provide possible solutions to those physical and psychological barriers, and finally, to provide an impetus for making those portions, and ultimately the entire campus, fully and equally accessible. I believe that the first three objectives were met in an appropriate manner. The fourth objective is one that more time is required to determine whether or not it has been met.

A significant limitation of this study that future research could help to eliminate is that the study area was limited to three particular housing clusters on campus. The entire campus should be studied in a similar manner and recommendations made for unifying the campus as a whole into a fully and equally accessible environment.

I believe that by becoming fully inclusive not only would LSU be providing an opportunity for everyone to learn and advance themselves, they would also be providing us all with many chances to make new friends, to experience more of life. So I will conclude with these thoughts: the more diverse our experiences become, the more open our minds become, the more open our minds become the more we will learn and grow.

## REFERENCE LIST

- ADA <http://www.access-board.gov/html/tables/tables-1.html>
- ADAAG <http://www.access-board.gov/adaag/html/adaag.htm>
- ASLA <http://www.asla.org/>
- Author not listed. 1999. Position statement: National recreation and park association policy on inclusion of the disabled. Parks and Recreation. December v34 p94
- Beaver, David. 1993. A reflection on person-first usage. Palaestra. Spring v9 n3 p4-6.
- Bednar, Micheal, ed. 1977. Barrier free environments. Stroudsburg, Pennsylvania. Dowden, Hutchinson and Ross.
- Block, Pamela. 2001. From pathology to power: Rethinking race, poverty and disability. Journal of Disability Policy Studies. v12 p18-35.
- Covington, George, and Hannah, Bruce. 1997. Access by design. New York. Van Nostrand Reinhold.
- Creno, Cathryn. 1992. How do you say it: advice for reporting on disability. The Quill. May v89 n4 p19-20.
- DASEPS <http://www.lareau.org/disgraph.html>
- Depauw, Karen, 2000. Social-cultural context of disability: Implications for scientific inquiry and professional preparation. Quest. v52, n4: 358-368.
- Disability symbols [http://www.etsav.upc.es/personals/laserreta/ac\\_symb.htm](http://www.etsav.upc.es/personals/laserreta/ac_symb.htm)
- Driskell, David, ed. 1996. A design guide: Universal access to outdoor recreation. Berkeley. Plae.
- Elliot, Timothy R. 1991. Interpersonal reactions to depression and physical disability in dyadic interactions. Journal of Applied Social Psychology 21, 16: 1293-1302
- Fishbein, M and Ajzen I. 1975. Belief, attitude, intention and behavior: An introduction to theory and research. Reading, Mass. Addison-Wesley.
- Furminger-Delisle, Heather. 1996. Uncut curbs and other obstacles: Mothers with disabilities. Contemporary Women's Issues Database. v12. Database on-line. Infonautics. 06-01-1996. p29-34.
- Gallagher, Hugh Gregory. 1995. Slapping up the spastics: The persistence of social attitudes toward people with disabilities. Issues in Law and Medicine 10 (Spring): 401-414.
- Imrie, Rob, and Hall, Peter. 2001. Inclusive design: Designing and developing accessible environments. London. Spon Pres.
- Loden, M and Roesner J.B. 1991. Workforce America: Managing Employee Diversity as a vital resource. Database on-line. Electric Library. Business One Irwin.
- Mace, Ron. 1998. Beyond affliction: Universal design. Interview by Ray Suarez. 6 May. transcript. Talk of the Nation (NPR). Washington, DC.
- McClintick, Bob. 1997. Not a piece of cake: tips on improving self-esteem. Paraplegia News. July. 68.
- NCSU <http://www.design.ncsu.edu/cud/>

New Mobility Online [http://www.newmobility.com/search\\_site.cfm](http://www.newmobility.com/search_site.cfm)

Penninx, Brenda. 1999. Exploring the effect of depression on physical disability: Longitudinal evidence from the established populations for epidemiologic studies for the elderly. *American Journal of Public Health*. v.89 n9: 1346-1352.

Perry, Elissa. 2000. An exploration of access and treatment discrimination and job satisfaction among college graduates with and without disabilities. Database on-line. Infotrac, BC 126Q445

Preiser, Wolfgang, ed. 2001. Universal design handbook. New York. McGraw-Hill.

Rehabilitation Act of 1973 <http://www.spot.pcc.edu/osd/504.htm>

Risher, P. 1998. The 1998 N.O.D. / Harris Survey of Americans with Disabilities. New York: Louis Harris and Associates, Inc.

Stone, Dianna L. 1996. A model of factors affecting the treatment of disabled individuals in organizations: Special topic forum on diversity within and among organizations. *Academy of Management Review*. v21. p353-402.

Tada, Joni Eareckson. 1992. Breaking down the barriers between us. *Accent On Living*, Summer, v37, 88.

Tam, Sing-Fai. 1998. Comparing the self-concepts of persons with and without physical disabilities. *Journal of Psychology*. v.132 n1: 78-87,

Title 34 [http://www.access.gpo.gov/nara/cfr/waisidx\\_99/34cfr104\\_99.html](http://www.access.gpo.gov/nara/cfr/waisidx_99/34cfr104_99.html)

Title 34 <http://www.spot.pcc.edu/osd/504.htm>

Yoshida, Roland K. 1990. Recent newspaper coverage about persons with disabilities. February v56 n5 p418-424.

**APPENDIX A:**  
**TITLE 34: FAIR HOUSING ACT OF 1974**

[Code of Federal Regulations]  
[Title 34, Volume 1, Parts 1 to 299]  
[Revised as of July 1, 1999]  
From the U.S. Government Printing Office via GPO Access  
[CITE: 34CFR104.45]

[Page 349]

TITLE 34--EDUCATION

CHAPTER I--OFFICE FOR CIVIL RIGHTS, DEPARTMENT OF EDUCATION

PART 104--NONDISCRIMINATION ON THE BASIS OF HANDICAP IN PROGRAMS AND ACTIVITIES  
RECEIVING FEDERAL FINANCIAL ASSISTANCE--Table of Contents

Subpart E--Postsecondary Education

Sec. 104.45 Housing.

(a) Housing provided by the recipient. A recipient that provides housing to its nonhandicapped students shall provide comparable, convenient, and accessible housing to handicapped students at the same cost as to others. At the end of the transition period provided for in subpart C, such housing shall be available in sufficient quantity and variety so that the scope of handicapped students' choice of living accommodations is, as a whole, comparable to that of nonhandicapped students.

(b) Other housing. A recipient that assists any agency, organization, or person in making housing available to any of its students shall take such action as may be necessary to assure itself that such housing is, as a whole, made available in a manner that does not result in discrimination on the basis of handicap.

**APPENDIX B**  
**PERTINENT TEXT FROM THE AMERICANS**  
**WITH DISABILITIES ACT**

3.4 General Terminology.

comply with. Meet one or more specifications of these guidelines.

if, if ... then. Denotes a specification that applies only when the conditions described are present.

may. Denotes an option or alternative.

shall. Denotes a mandatory specification or requirement.

should. Denotes an advisory specification or recommendation.

3.5 Definitions.

Access Aisle.

An accessible pedestrian space between elements, such as parking spaces, seating, and desks, that provides clearances appropriate for use of the elements.

Accessible.

Describes a site, building, facility, or portion thereof that complies with these guidelines.

Accessible Element.

An element specified by these guidelines (for example, telephone, controls, and the like).

Accessible Route.

A continuous unobstructed path connecting all accessible elements and spaces of a building or facility. Interior accessible routes may include corridors, floors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, crosswalks at vehicular ways, walks, ramps, and lifts.

Accessible Space.

Space that complies with these guidelines.

Adaptability.

The ability of certain building spaces and elements, such as kitchen counters, sinks, and grab bars, to be added or altered so as to accommodate the needs of individuals with or without disabilities or to accommodate the needs of persons with different types or degrees of disability.

Addition.

An expansion, extension, or increase in the gross floor area of a building or facility.

Administrative Authority

A governmental agency that adopts or enforces regulations and guidelines for the design, construction, or alteration of buildings and facilities.

Alteration.

An alteration is a change to a building or facility that affects or could affect the usability of the building or facility or part thereof. Alterations include, but are not limited to, remodeling, renovation, rehabilitation, reconstruction, historic restoration, resurfacing of circulation paths or vehicular ways, changes or rearrangement of the structural parts or elements, and changes or rearrangement in the plan configuration of walls and full-height partitions. Normal maintenance, reroofing, painting or wallpapering, or changes to mechanical and electrical systems are not alterations unless they affect the usability of the building or facility.

**Area of Rescue Assistance**

An area, which has direct access to an exit, where people who are unable to use stairs may remain temporarily in safety to await further instructions or assistance during emergency evacuation.

**Assembly Area.**

A room or space accommodating a group of individuals for recreational, educational, political, social, civic, or amusement purposes, or for the consumption of food and drink.

**Building.**

Any structure used and intended for supporting or sheltering any use or occupancy.

**Circulation Path**

An exterior or interior way of passage from one place to another for pedestrians, including, but not limited to, walks, hallways, courtyards, stairways, and stair landings.

**Clear.**

Unobstructed.

**Clear Floor Space.**

The minimum unobstructed floor or ground space required to accommodate a single, stationary wheelchair and occupant.

**Closed Circuit Telephone.**

A telephone with dedicated line(s) such as a house phone, courtesy phone or phone that must be used to gain entrance to a facility.

**Common Use.**

Refers to those interior and exterior rooms, spaces, or elements that are made available for the use of a restricted group of people (for example, occupants of a homeless shelter, the occupants of an office building, or the guests of such occupants).

**Cross Slope.**

The slope that is perpendicular to the direction of travel (see running slope).

**Curb Ramp.**

A short ramp cutting through a curb or built up to it.

**Detectable Warning.**

A standardized surface feature built in or applied to walking surfaces or other elements to warn visually impaired people of hazards on a circulation path.

**Dwelling Unit.**

A single unit which provides a kitchen or food preparation area, in addition to rooms and spaces for living, bathing, sleeping, and the like. Dwelling units include a single family home or a townhouse used as a transient group home; an apartment building used as a shelter; guestrooms in a hotel that provide sleeping accommodations and food preparation areas; and other similar facilities used on a transient basis. For purposes of these guidelines, use of the term "Dwelling Unit" does not imply the unit is used as a residence.

**Egress, Means of.**

A continuous and unobstructed way of exit travel from any point in a building or facility to a public way. A means of egress comprises vertical and horizontal travel and may include intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, horizontal exits, courts and yards. An accessible means of egress is one that complies with these guidelines and does not include stairs, steps, or escalators. Areas of rescue assistance or evacuation elevators may be included as part of accessible means of egress.



**Element.**

An architectural or mechanical component of a building, facility, space, or site, e.g., telephone, curb ramp, door, drinking fountain, seating, or water closet.

**Entrance.**

Any access point to a building or portion of a building or facility used for the purpose of entering. An entrance includes the approach walk, the vertical access leading to the entrance platform, the entrance platform itself, vestibules if provided, the entry door(s) or gate(s), and the hardware of the entry door(s) or gate(s).

**Facility.**

All or any portion of buildings, structures, site improvements, complexes, equipment, roads, walks, passageways, parking lots, or other real or personal property located on a site.

**Ground Floor**

Any occupiable floor less than one story above or below grade with direct access to grade. A building or facility always has at least one ground floor and may have more than one ground floor as where a split level entrance has been provided or where a building is built into a hillside.

**Mezzanine or Mezzanine Floor.**

That portion of a story which is an intermediate floor level placed within the story and having occupiable space above and below its floor.

**Marked Crossing.**

A crosswalk or other identified path intended for pedestrian use in crossing a vehicular way.

**Multifamily Dwelling.**

Any building containing more than two dwelling units.

**Occupiable.**

A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes, or in which occupants are engaged at labor, and which is equipped with means of egress, light, and ventilation.

**Operable Part.**

A part of a piece of equipment or appliance used to insert or withdraw objects, or to activate, deactivate, or adjust the equipment or appliance (for example, coin slot, pushbutton, handle).

**Path of Travel.**

(Reserved).

**Power-assisted Door.**

A door used for human passage with a mechanism that helps to open the door, or relieves the opening resistance of a door, upon the activation of a switch or a continued force applied to the door itself.

**Private Facility.**

A place of public accommodation or a commercial facility subject to title III of the ADA and 28 CFR part 36 or a transportation facility subject to title III of the ADA and 49 CFR 37.45.

**Public Facility.**

A facility or portion of a facility constructed by, on behalf of, or for the use of a public entity subject to title II of the ADA and 28 CFR part 35 or to title II of the ADA and 49 CFR 37.41 or 37.43.

**Public Use.**

Describes interior or exterior rooms or spaces that are made available to the general public. Public use may be provided at a building or facility that is privately or publicly owned.

Ramp.

A walking surface which has a running slope greater than 1:20.

Running Slope.

The slope that is parallel to the direction of travel (see cross slope).

Service Entrance.

An entrance intended primarily for delivery of goods or services.

Signage.

Displayed verbal, symbolic, tactile, and pictorial information.

Site.

A parcel of land bounded by a property line or a designated portion of a public right-of-way.

Site Improvement.

Landscaping, paving for pedestrian and vehicular ways, outdoor lighting, recreational facilities, and the like, added to a site.

Sleeping Accommodations.

Rooms in which people sleep; for example, dormitory and hotel or motel guest rooms or suites.

Space.

A definable area, e.g., room, toilet room, hall, assembly area, entrance, storage room, alcove, courtyard, or lobby.

Story.

That portion of a building included between the upper surface of a floor and upper surface of the floor or roof next above. If such portion of a building does not include occupiable space, it is not considered a story for purposes of these guidelines. There may be more than one floor level within a story as in the case of a mezzanine or mezzanines.

Structural Frame.

The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and all other members which are essential to the stability of the building as a whole.

Tactile.

Describes an object that can be perceived using the sense of touch.

TDD (Telecommunication Devices for the Deaf).

See text telephone.

Technically Infeasible.

See [4.1.6\(1\)\(j\)](#) EXCEPTION.

Text Telephone (TTY).

Machinery or equipment that employs interactive text based communications through the transmission of coded signals across the standard telephone network. Text telephones can include, for example, devices known as TDDs (telecommunication display devices or telecommunication devices for deaf persons) or computers with special modems. Text telephones are also called TTYs, an abbreviation for tele-typewriter.

Transient Lodging.\*

A building, facility, or portion thereof, excluding inpatient medical care facilities and residential facilities, that contains sleeping accommodations. Transient lodging may include, but is not limited to, resorts, group homes, hotels, motels, and dormitories.

TTY (Tele-Typewriter).

See text telephone.

Vehicular Way.

A route intended for vehicular traffic, such as a street, driveway, or parking lot.

Walk.

An exterior pathway with a prepared surface intended for pedestrian use, including general pedestrian areas such as plazas and courts.

#### 4.11 Platform Lifts (Wheelchair Lifts).

4.11.1 Location. Platform lifts (wheelchair lifts) permitted by 4.1 shall comply with the requirements of 4.11.

4.11.2\* Other Requirements. If platform lifts (wheelchair lifts) are used, they shall comply with [4.2.4](#), [4.5](#), [4.27](#), and [ASME A17.1 Safety Code for Elevators and Escalators, Section XX, 1990](#).

4.11.3 Entrance. If platform lifts are used then they shall facilitate unassisted entry, operation, and exit from the lift in compliance with [4.11.2](#).

#### 4.14 Entrances.

4.14.1 Minimum Number. Entrances required to be accessible by [4.1](#) shall be part of an accessible route complying with [4.3](#). Such entrances shall be connected by an accessible route to public transportation stops, to accessible parking and passenger loading zones, and to public streets or sidewalks if available (see [4.3.2\(1\)](#)). They shall also be connected by an accessible route to all accessible spaces or elements within the building or facility.

4.14.2 Service Entrances. A service entrance shall not be the sole accessible entrance unless it is the only entrance to a building or facility (for example, in a factory or garage).

4.1.2 Accessible Sites and Exterior Facilities: New Construction. An accessible site shall meet the following minimum requirements:

(1) At least one accessible route complying with [4.3](#) shall be provided within the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones if provided, and public streets or sidewalks, to an accessible building entrance.

(2) At least one accessible route complying with [4.3](#) shall connect accessible buildings, accessible facilities, accessible elements, and accessible spaces that are on the same site.

(3) All objects that protrude from surfaces or posts into circulation paths shall comply with [4.4](#).

(4) Ground surfaces along accessible routes and in accessible spaces shall comply with [4.5](#).

(6) If toilet facilities are provided on a site, then each such public or common use toilet facility shall comply with [4.22](#). If bathing facilities are provided on a site, then each such public or common use bathing facility shall comply with 4.23. For single user portable toilet or bathing units clustered at a single location, at least 5% but no less than one toilet unit or bathing unit complying with 4.22 or 4.23 shall be installed at each cluster whenever typical inaccessible units are provided. Accessible units shall be identified by the International Symbol of Accessibility.

EXCEPTION: Portable toilet units at construction sites used exclusively by construction personnel are not required to comply with 4.1.2(6).

(7) Building Signage. Signs which designate permanent rooms and spaces shall comply with 4.30.1, 4.30.4, 4.30.5 and 4.30.6. Other signs which provide direction to, or information about, functional spaces of the building shall comply with 4.30.1, 4.30.2, 4.30.3, and 4.30.5. Elements

and spaces of accessible facilities which shall be identified by the International Symbol of Accessibility and which shall comply with 4.30.7 are:

- (a) Parking spaces designated as reserved for individuals with disabilities;
- (b) Accessible passenger loading zones;
- (c) Accessible entrances when not all are accessible (inaccessible entrances shall have directional signage to indicate the route to the nearest accessible entrance);
- (d) Accessible toilet and bathing facilities when not all are accessible.

4.1.3 Accessible Buildings: New Construction. Accessible buildings and facilities shall meet the following minimum requirements:

- (1) At least one accessible route complying with [4.3](#) shall connect accessible building or facility entrances with all accessible spaces and elements within the building or facility.
- (2) All objects that overhang or protrude into circulation paths shall comply with [4.4](#).
- (3) Ground and floor surfaces along accessible routes and in accessible rooms and spaces shall comply with [4.5](#).
- (4) Interior and exterior stairs connecting levels that are not connected by an elevator, ramp, or other accessible means of vertical access shall comply with [4.9](#).

EXCEPTION 3: Accessible ramps complying with [4.8](#) may be used in lieu of an elevator.

EXCEPTION 4: Platform lifts (wheelchair lifts) complying with [4.11](#) of this guideline and applicable State or local codes may be used in lieu of an elevator only under the following conditions:

- (a) To provide an accessible route to a performing area in an assembly occupancy.
- (b) To comply with the wheelchair viewing position line-of-sight and dispersion requirements of [4.33.3](#).
- (c) To provide access to incidental occupiable spaces and rooms which are not open to the general public and which house no more than five persons, including but not limited to equipment control rooms and projection booths.
- (d) To provide access where existing site constraints or other constraints make use of a ramp or an elevator infeasible.
- (e) To provide access to raised judges' benches, clerks' stations, speakers' platforms, jury boxes and witness stands or to depressed areas such as the well of a court.

(7) Doors:

- (a) At each accessible entrance to a building or facility, at least one door shall comply with [4.13](#).
- (b) Within a building or facility, at least one door at each accessible space shall comply with [4.13](#).
- (c) Each door that is an element of an accessible route shall comply with [4.13](#).
- (d) Each door required by [4.3.10](#), Egress, shall comply with [4.13](#).

(8)\* The requirements in (a) and (b) below shall be satisfied independently:

(a)(i) At least 50 percent of all public entrances (excluding those in (b) below) shall comply with [4.14](#). At least one must be a ground floor entrance. Public entrances are any entrances that are not loading or service entrances.

(ii) Accessible public entrances must be provided in a number at least equivalent to the number of exits required by the applicable building or fire codes. (This paragraph does not require an increase in the total number of public entrances planned for a facility.)

(iii) An accessible public entrance must be provided to each tenancy in a facility (for example, individual stores in a strip shopping center).

(iv) In detention and correctional facilities subject to section 12, public entrances that are secured shall be accessible as required by [12.2.1](#).

One entrance may be considered as meeting more than one of the requirements in (a). Where feasible, accessible public entrances shall be the entrances used by the majority of people visiting or working in the building.

(b)(i) In addition, if direct access is provided for pedestrians from an enclosed parking garage to the building, at least one direct entrance from the garage to the building must be accessible.

(ii) If access is provided for pedestrians from a pedestrian tunnel or elevated walkway, one entrance to the building from each tunnel or walkway must be accessible.

(iii) In judicial, legislative, and regulatory facilities subject to section 11, restricted and secured entrances shall be accessible in the number required by [11.1.1](#).

One entrance may be considered as meeting more than one of the requirements in (b).

Because entrances also serve as emergency exits whose proximity to all parts of buildings and facilities is essential, it is preferable that all entrances be accessible.

(c) If the only entrance to a building, or tenancy in a facility, is a service entrance, that entrance shall be accessible.

(d) Entrances which are not accessible shall have directional signage complying with [4.30.1](#), [4.30.2](#), [4.30.3](#), and [4.30.5](#), which indicates the location of the nearest accessible entrance.

(9)\* In buildings or facilities, or portions of buildings or facilities, required to be accessible, accessible means of egress shall be provided in the same number as required for exits by local building/life safety regulations. Where a required exit from an occupiable level above or below a level of accessible exit discharge is not accessible, an area of rescue assistance shall be provided on each such level (in a number equal to that of inaccessible required exits). Areas of rescue assistance shall comply with [4.3.11](#). A horizontal exit, meeting the requirements of local building/life safety regulations, shall satisfy the requirement for an area of rescue assistance.

EXCEPTION: Areas of rescue assistance are not required in buildings or facilities having a supervised automatic sprinkler system.

(10)\* Drinking Fountains:

(a) Where only one drinking fountain is provided on a floor there shall be a drinking fountain which is accessible to individuals who use wheelchairs in accordance with [4.15](#) and one accessible to those who have difficulty bending or stooping. (This can be accommodated by the use of a "hi-lo" fountain; by providing one fountain accessible to those who use wheelchairs and one fountain at a standard height convenient for those who have difficulty bending; by providing a fountain accessible under 4.15 and a water cooler; or by such other means as would achieve the required accessibility for each group on each floor.)

(b) Where more than one drinking fountain or water cooler is provided on a floor, 50% of those provided shall comply with [4.15](#) and shall be on an accessible route.

(11) Toilet Facilities: If toilet rooms are provided, then each public and common use toilet room shall comply with [4.22](#). Other toilet rooms provided for the use of occupants of specific spaces (i.e., a private toilet room for the occupant of a private office) shall be adaptable. If bathing rooms are provided, then each public and common use bathroom shall comply with [4.23](#). Accessible toilet rooms and bathing facilities shall be on an accessible route.

(12) Storage, Shelving and Display Units:

(a) If fixed or built-in storage facilities such as cabinets, shelves, closets, and drawers are provided in accessible spaces, at least one of each type provided shall contain storage space complying with [4.25](#). Additional storage may be provided outside of the dimensions required by [4.25](#).

(b) Shelves or display units allowing self-service by customers in mercantile occupancies shall be located on an accessible route complying with [4.3](#). Requirements for accessible reach range do not apply.

(13) Controls and operating mechanisms in accessible spaces, along accessible routes, or as parts of accessible elements (for example, light switches and dispenser controls) shall comply with [4.27](#).

(14) If emergency warning systems are provided, then they shall include both audible alarms and visual alarms complying with [4.28](#). Sleeping accommodations required to comply with [9.3](#) shall have an alarm system complying with [4.28](#). Emergency warning systems in medical care facilities may be modified to suit standard health care alarm design practice.

(15) Detectable warnings shall be provided at locations as specified in [4.29](#).

(16) Building Signage:

(a) Signs which designate permanent rooms and spaces shall comply with [4.30.1](#), [4.30.4](#), [4.30.5](#) and [4.30.6](#).

(b) Other signs which provide direction to or information about functional spaces of the building shall comply with [4.30.1](#), [4.30.2](#), [4.30.3](#), and [4.30.5](#).

EXCEPTION: Building directories, menus, and all other signs which are temporary are not required to comply.

(17) Public telephones:

<sup>3</sup> EXCEPTION: For exterior installations only, if dial tone first service is available, then a side reach telephone may be installed instead of the required forward reach telephone (i.e., one telephone in proximity to each bank shall comply with [4.31](#)).

(b)\* All telephones required to be accessible and complying with [4.31.2](#) through [4.31.8](#) shall be equipped with a volume control. In addition, 25 percent, but never less than one, of all other public telephones provided shall be equipped with a volume control and shall be dispersed among all types of public telephones, including closed circuit telephones, throughout the building or facility. Signage complying with applicable provisions of [4.30.7](#) shall be provided.

(c) The following shall be provided in accordance with [4.31.9](#):

(i) If four or more public pay telephones (including both interior and exterior telephones) are provided at a site of a private facility, and at least one is in an interior location, then at least one interior public text telephone (TTY) shall be provided. If an interior public pay telephone is provided in a public use area in a building of a public facility, at least one interior public text telephone (TTY) shall be provided in the building in a public use area.

(ii) If an interior public pay telephone is provided in a private facility that is a stadium or arena, a convention center, a hotel with a convention center, or a covered mall, at least one interior public text telephone (TTY) shall be provided in the facility. In stadiums, arenas and convention centers which are public facilities, at least one public text

telephone (TTY) shall be provided on each floor level having at least one interior public pay telephone.

(iii) If a public pay telephone is located in or adjacent to a hospital emergency room, hospital recovery room, or hospital waiting room, one public text telephone (TTY) shall be provided at each such location.

(iv) If an interior public pay telephone is provided in the secured area of a detention or correctional facility subject to section 12, then at least one public text telephone (TTY) shall also be provided in at least one secured area. Secured areas are those areas used only by detainees or inmates and security personnel.

(18) If fixed or built-in seating or tables (including, but not limited to, study carrels and student laboratory stations), are provided in accessible public or common use areas, at least five percent (5%), but not less than one, of the fixed or built-in seating areas or tables shall comply with [4.32](#). An accessible route shall lead to and through such fixed or built-in seating areas, or tables.

(19)\* Assembly areas:

(a) In places of assembly with fixed seating accessible wheelchair locations shall comply with [4.33.2](#), [4.33.3](#), and [4.33.4](#) and shall be provided consistent with the following table:

Capacity of Seating in Assembly Area	Number of Required Wheelchair Locations
4 to 25	1
26 to 50	2
51 to 300	4
301 to 500	6
over 500	6 plus 1 additional space for each total seating capacity increase of 100

In addition, one percent, but not less than one, of all fixed seats shall be aisle seats with no armrests on the aisle side, or removable or folding armrests on the aisle side. Each such seat shall be identified by a sign or marker. Signage notifying patrons of the availability of such seats shall be posted at the ticket office. Aisle seats are not required to comply with [4.33.4](#).

(b) This paragraph applies to assembly areas where audible communications are integral to the use of the space (e.g., concert and lecture halls, playhouses and movie theaters, meeting rooms, etc.). Such assembly areas, if (1) they accommodate at least 50 persons, or if they have audio-amplification systems, and (2) they have fixed seating, shall have a permanently installed assistive listening system complying with [4.33](#). For other assembly areas, a permanently installed assistive listening system, or an adequate number of electrical outlets or other supplementary wiring necessary to support a portable assistive listening system shall be provided. The minimum number of receivers to be provided shall be equal to 4 percent of the total number of seats, but in no case less than two. Signage complying with applicable provisions of [4.30](#) shall be installed to notify patrons of the availability of a listening system.

#### 4.30 Signage.

4.30.1\* General. Signage required to be accessible by [4.1](#) shall comply with the applicable provisions of 4.30.

4.30.2\* Character Proportion. Letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10.

4.30.3 Character Height. Characters and numbers on signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case X. Lower case characters are permitted.

Height Above Finished Floor	Minimum Character Height
Suspended or Projected Overhead in compliance with 4.4.2	3 in (75 mm) minimum

4.30.4 Raised and Brailled Characters and Pictorial Symbol Signs (Pictograms). Letters and numerals shall be raised 1/32 in (0.79 mm) minimum, upper case, sans serif or simple serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 in (16 mm) high, but no higher than 2 in (50 mm). Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram shall be 6 in (152 mm) minimum in height.

4.30.5\* Finish and Contrast. The characters and background of signs shall be eggshell, matte, or other non-glare finish. Characters and symbols shall contrast with their background -- either light characters on a dark background or dark characters on a light background.

4.30.6 Mounting Location and Height. Where permanent identification is provided for rooms and spaces, signs shall be installed on the wall adjacent to the latch side of the door. Where there is no wall space to the latch side of the door, including at double leaf doors, signs shall be placed on the nearest adjacent wall. Mounting height shall be 60 in (1525 mm) above the finish floor to the centerline of the sign. Mounting location for such signage shall be so that a person may approach within 3 in (76 mm) of signage without encountering protruding objects or standing within the swing of a door.

#### 4.30.7\* Symbols of Accessibility.

(1) Facilities and elements required to be identified as accessible by [4.1](#) shall use the international symbol of accessibility. The symbol shall be displayed as shown in [Fig. 43\(a\)](#) and [\(b\)](#).

(2) Volume Control Telephones. Telephones required to have a volume control by [4.1.3\(17\)\(b\)](#) shall be identified by a sign containing a depiction of a telephone handset with radiating sound waves.

(3) Text Telephones (TTYs). Text telephones (TTYs) required by [4.1.3\(17\)\(c\)](#) shall be identified by the international TTY symbol ([Fig 43\(c\)](#)). In addition, if a facility has a public text telephone (TTY), directional signage indicating the location of the nearest text telephone (TTY) shall be placed adjacent to all banks of telephones which do not contain a text telephone (TTY). Such directional signage shall include the international TTY symbol. If a facility has no banks of telephones, the directional signage shall be provided at the entrance (e.g., in a building directory).

(4) Assistive Listening Systems. In assembly areas where permanently installed assistive listening systems are required by [4.1.3\(19\)\(b\)](#) the availability of such systems shall be identified with signage that includes the international symbol of access for hearing loss ([Fig 43\(d\)](#)).

#### 4.3 Accessible Route.

4.3.1\* General. All walks, halls, corridors, aisles, skywalks, tunnels, and other spaces that are part of an accessible route shall comply with [4.3](#).



#### 4.3.2 Location.

- (1) At least one accessible route within the boundary of the site shall be provided from public transportation stops, accessible parking, and accessible passenger loading zones, and public streets or sidewalks to the accessible building entrance they serve. The accessible route shall, to the maximum extent feasible, coincide with the route for the general public.
- (2) At least one accessible route shall connect accessible buildings, facilities, elements, and spaces that are on the same site.
- (3) At least one accessible route shall connect accessible building or facility entrances with all accessible spaces and elements and with all accessible dwelling units within the building or facility.
- (4) An accessible route shall connect at least one accessible entrance of each accessible dwelling unit with those exterior and interior spaces and facilities that serve the accessible dwelling unit.

4.3.3 Width. The minimum clear width of an accessible route shall be 36 in (915 mm) except at doors (see [4.13.5](#) and [4.13.6](#)). If a person in a wheelchair must make a turn around an obstruction, the minimum clear width of the accessible route shall be as shown in [Fig. 7\(a\)](#) and [\(b\)](#).

4.3.4 Passing Space. If an accessible route has less than 60 in (1525 mm) clear width, then passing spaces at least 60 in by 60 in (1525 mm by 1525 mm) shall be located at reasonable intervals not to exceed 200 ft (61 m). A T-intersection of two corridors or walks is an acceptable passing place.

4.3.5 Head Room. Accessible routes shall comply with [4.4.2](#).

4.3.6 Surface Textures. The surface of an accessible route shall comply with [4.5](#).

4.3.7 Slope. An accessible route with a running slope greater than 1:20 is a ramp and shall comply with [4.8](#). Nowhere shall the cross slope of an accessible route exceed 1:50.

4.3.8 Changes in Levels. Changes in levels along an accessible route shall comply with [4.5.2](#). If an accessible route has changes in level greater than 1/2 in (13 mm), then a curb ramp, ramp, elevator, or platform lift (as permitted in [4.1.3](#) and [4.1.6](#)) shall be provided that complies with [4.7](#), [4.8](#), [4.10](#), or [4.11](#), respectively. An accessible route does not include stairs, steps, or escalators. See definition of "egress, means of" in [3.5](#).

4.3.9 Doors. Doors along an accessible route shall comply with [4.13](#).

4.3.10\* Egress. Accessible routes serving any accessible space or element shall also serve as a means of egress for emergencies or connect to an accessible area of rescue assistance.

4.3.11 Areas of Rescue Assistance.

4.3.11.1 Location and Construction. An area of rescue assistance shall be one of the following:

- (1) A portion of a stairway landing within a smokeproof enclosure (complying with local requirements).
- (2) A portion of an exterior exit balcony located immediately adjacent to an exit stairway when the balcony complies with local requirements for exterior exit balconies. Openings to the interior of the building located within 20 feet (6 m) of the area of rescue assistance shall be protected with fire assemblies having a three-fourths hour fire protection rating.
- (3) A portion of a one-hour fire-resistive corridor (complying with local requirements for fire-resistive construction and for openings) located immediately adjacent to an exit enclosure.
- (4) A vestibule located immediately adjacent to an exit enclosure and constructed to the same fire-resistive standards as required for corridors and openings.
- (5) A portion of a stairway landing within an exit enclosure which is vented to the exterior and is separated from the interior of the building with not less than one-hour fire-resistive doors.

(6) When approved by the appropriate local authority, an area or a room which is separated from other portions of the building by a smoke barrier. Smoke barriers shall have a fire-resistive rating of not less than one hour and shall completely enclose the area or room. Doors in the smoke barrier shall be tight-fitting smoke- and draft-control assemblies having a fire-protection rating of not less than 20 minutes and shall be self-closing or automatic closing. The area or room shall be provided with an exit directly to an exit enclosure. Where the room or area exits into an exit enclosure which is required to be of more than one-hour fire-resistive construction, the room or area shall have the same fire-resistive construction, including the same opening protection, as required for the adjacent exit enclosure.

(7) An elevator lobby when elevator shafts and adjacent lobbies are pressurized as required for smokeproof enclosures by local regulations and when complying with requirements herein for size, communication, and signage. Such pressurization system shall be activated by smoke detectors on each floor located in a manner approved by the appropriate local authority. Pressurization equipment and its duct work within the building shall be separated from other portions of the building by a minimum two-hour fire-resistive construction.

4.3.11.2 Size. Each area of rescue assistance shall provide at least two accessible areas each being not less than 30 inches by 48 inches (760 mm by 1220 mm). The area of rescue assistance shall not encroach on any required exit width. The total number of such 30-inch by 48-inch (760 mm by 1220 mm) areas per story shall be not less than one for every 200 persons of calculated occupant load served by the area of rescue assistance.

EXCEPTION: The appropriate local authority may reduce the minimum number of 30-inch by 48-inch (760 mm by 1220 mm) areas to one for each area of rescue assistance on floors where the occupant load is less than 200.

4.3.11.3\* Stairway Width. Each stairway adjacent to an area of rescue assistance shall have a minimum clear width of 48 inches between handrails.

4.3.11.4\* Two-way Communication. A method of two-way communication, with both visible and audible signals, shall be provided between each area of rescue assistance and the primary entry. The fire department or appropriate local authority may approve a location other than the primary entry.

4.3.11.5 Identification. Each area of rescue assistance shall be identified by a sign which states "AREA OF RESCUE ASSISTANCE" and displays the international symbol of accessibility. The sign shall be illuminated when exit sign illumination is required. Signage shall also be installed at all inaccessible exits and where otherwise necessary to clearly indicate the direction to areas of rescue assistance. In each area of rescue assistance, instructions on the use of the area under emergency conditions shall be posted adjoining the two-way communication system.

#### 4.33 Assembly Areas.

4.33.1 Minimum Number. Assembly and associated areas required to be accessible by [4.1](#) shall comply with 4.33.

4.33.2\* Size of Wheelchair Locations. Each wheelchair location shall provide minimum clear ground or floor spaces as shown in [Fig. 46](#).

4.33.3\* Placement of Wheelchair Locations. Wheelchair areas shall be an integral part of any fixed seating plan and shall be provided so as to provide people with physical disabilities a choice of admission prices and lines of sight comparable to those for members of the general public. They shall adjoin an accessible route that also serves as a means of egress in case of emergency. At least one companion fixed seat shall be provided next to each wheelchair seating area. When the seating capacity exceeds 300, wheelchair spaces shall be provided in more than one location. Readily removable seats may be installed in wheelchair spaces when the spaces are not required to accommodate wheelchair users.

EXCEPTION: Accessible viewing positions may be clustered for bleachers, balconies, and other areas having sight lines that require slopes of greater than 5 percent. Equivalent accessible viewing positions may be located on levels having accessible egress.

4.33.4 Surfaces. The ground or floor at wheelchair locations shall be level and shall comply with [4.5](#).

4.33.5 Access to Performing Areas. An accessible route shall connect wheelchair seating locations with performing areas, including stages, arena floors, dressing rooms, locker rooms, and other spaces used by performers.

4.33.6\* Placement of Listening Systems. If the listening system provided serves individual fixed seats, then such seats shall be located within a 50 ft (15 m) viewing distance of the stage or playing area and shall have a complete view of the stage or playing area.

4.33.7\* Types of Listening Systems. Assistive listening systems (ALS) are intended to augment standard public address and audio systems by providing signals which can be received directly by persons with special receivers or their own hearing aids and which eliminate or filter background noise. The type of assistive listening system appropriate for a particular application depends on the characteristics of the setting, the nature of the program, and the intended audience. Magnetic induction loops, infra-red and radio frequency systems are types of listening systems which are appropriate for various applications.

#### 4.4 Protruding Objects.

4.4.1\* General. Objects projecting from walls (for example, telephones) with their leading edges between 27 in and 80 in (685 mm and 2030 mm) above the finished floor shall protrude no more than 4 in (100 mm) into walks, halls, corridors, passageways, or aisles ([see Fig. 8\(a\)](#)). Objects mounted with their leading edges at or below 27 in (685 mm) above the finished floor may protrude any amount ([see Fig. 8\(a\)](#) and [\(b\)](#)). Free-standing objects mounted on posts or pylons may overhang 12 in (305 mm) maximum from 27 in to 80 in (685 mm to 2030 mm) above the ground or finished floor ([see Fig. 8\(c\)](#) and [\(d\)](#)). Protruding objects shall not reduce the clear width of an accessible route or maneuvering space ([see Fig. 8\(e\)](#)).

4.4.2 Head Room. Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 80 in (2030 mm) minimum clear head room ([see Fig. 8\(a\)](#)). If vertical clearance of an area adjoining an accessible route is reduced to less than 80 in (nominal dimension), a barrier to warn blind or visually-impaired persons shall be provided ([see Fig. 8\(c-1\)](#)).

#### 4.5 Ground and Floor Surfaces.

4.5.1\* General. Ground and floor surfaces along accessible routes and in accessible rooms and spaces including floors, walks, ramps, stairs, and curb ramps, shall be stable, firm, slip-resistant, and shall comply with 4.5.

4.5.2 Changes in Level. Changes in level up to 1/4 in (6 mm) may be vertical and without edge treatment ([see Fig. 7\(c\)](#)). Changes in level between 1/4 in and 1/2 in (6 mm and 13 mm) shall be beveled with a slope no greater than 1:2 ([see Fig. 7\(d\)](#)). Changes in level greater than 1/2 in (13 mm) shall be accomplished by means of a ramp that complies with [4.7](#) or [4.8](#).

4.5.3\* Carpet. If carpet or carpet tile is used on a ground or floor surface, then it shall be securely attached; have a firm cushion, pad, or backing, or no cushion or pad; and have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. The maximum pile thickness shall be 1/2 in (13 mm) ([see Fig. 8\(f\)](#)). Exposed edges of carpet shall be fastened to floor surfaces and have trim along the entire length of the exposed edge. Carpet edge trim shall comply with [4.5.2](#).

4.5.4 Gratings. If gratings are located in walking surfaces, then they shall have spaces no greater than 1/2 in (13 mm) wide in one direction ([see Fig. 8\(g\)](#)). If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel ([see Fig. 8\(h\)](#)).

#### 4.7 Curb Ramps.

4.7.1 Location. Curb ramps complying with 4.7 shall be provided wherever an accessible route crosses a curb.

4.7.2 Slope. Slopes of curb ramps shall comply with [4.8.2](#). The slope shall be measured as shown in [Fig. 11](#). Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes. Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb ramp, or accessible route shall not exceed 1:20.

4.7.3 Width. The minimum width of a curb ramp shall be 36 in (915 mm), exclusive of flared sides.

4.7.4 Surface. Surfaces of curb ramps shall comply with [4.5](#).

4.7.5 Sides of Curb Ramps. If a curb ramp is located where pedestrians must walk across the ramp, or where it is not protected by handrails or guardrails, it shall have flared sides; the maximum slope of the flare shall be 1:10 ([see Fig. 12\(a\)](#)). Curb ramps with returned curbs may be used where pedestrians would not normally walk across the ramp ([see Fig. 12\(b\)](#)).

4.7.6 Built-up Curb Ramps. Built-up curb ramps shall be located so that they do not project into vehicular traffic lanes ([see Fig. 13](#)).

4.7.7 Detectable Warnings. A curb ramp shall have a detectable warning complying with [4.29.2](#). The detectable warning shall extend the full width and depth of the curb ramp.

4.7.8 Obstructions. Curb ramps shall be located or protected to prevent their obstruction by parked vehicles.

4.7.9 Location at Marked Crossings. Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides. ([see Fig. 15](#)).

4.7.10 Diagonal Curb Ramps. If diagonal (or corner type) curb ramps have returned curbs or other well-defined edges, such edges shall be parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have 48 in (1220 mm) minimum clear space as shown in [Fig. 15\(c\)](#) and [\(d\)](#). If diagonal curb ramps are provided at marked crossings, the 48 in (1220 mm) clear space shall be within the markings ([see Fig. 15\(c\)](#) and [\(d\)](#)). If diagonal curb ramps have flared sides, they shall also have at least a 24 in (610 mm) long segment of straight curb located on each side of the curb ramp and within the marked crossing ([see Fig. 15\(c\)](#)).

4.7.11 Islands. Any raised islands in crossings shall be cut through level with the street or have curb ramps at both sides and a level area at least 48 in (1220 mm) long between the curb ramps in the part of the island intersected by the crossings ([see Fig. 15\(a\)](#) and [\(b\)](#)).

#### 4.8 Ramps.

4.8.1\* General. Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with 4.8.

4.8.2\* Slope and Rise. The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be 30 in (760 mm) ([see Fig. 16](#)). Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as allowed in [4.1.6\(3\)\(a\)](#) if space limitations prohibit the use of a 1:12 slope or less.

4.8.3 Clear Width. The minimum clear width of a ramp shall be 36 in (915 mm).

4.8.4\* Landings. Ramps shall have level landings at bottom and top of each ramp and each ramp run. Landings shall have the following features:

- (1) The landing shall be at least as wide as the ramp run leading to it.
- (2) The landing length shall be a minimum of 60 in (1525 mm) clear.
- (3) If ramps change direction at landings, the minimum landing size shall be 60 in by 60 in (1525 mm by 1525 mm).
- (4) If a doorway is located at a landing, then the area in front of the doorway shall comply with [4.13.6](#).

4.8.5\* Handrails. If a ramp run has a rise greater than 6 in (150 mm) or a horizontal projection greater than 72 in (1830 mm), then it shall have handrails on both sides. Handrails are not required on curb ramps or adjacent to seating in assembly areas. Handrails shall comply with [4.26](#) and shall have the following features:

- (1) Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback or dogleg ramps shall always be continuous.

- (2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top and bottom of the ramp segment and shall be parallel with the floor or ground surface ([see Fig. 17](#)).
- (3) The clear space between the handrail and the wall shall be 1 - 1/2 in (38 mm).
- (4) Gripping surfaces shall be continuous.
- (5) Top of handrail gripping surfaces shall be mounted between 34 in and 38 in (865 mm and 965 mm) above ramp surfaces.
- (6) Ends of handrails shall be either rounded or returned smoothly to floor, wall, or post.
- (7) Handrails shall not rotate within their fittings.

4.8.6 Cross Slope and Surfaces. The cross slope of ramp surfaces shall be no greater than 1:50. Ramp surfaces shall comply with [4.5](#).

4.8.7 Edge Protection. Ramps and landings with drop-offs shall have curbs, walls, railings, or projecting surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 in (50 mm) high ([see Fig. 17](#)).

4.8.8 Outdoor Conditions. Outdoor ramps and their approaches shall be designed so that water will not accumulate on walking surfaces.

#### 4.9 Stairs.

4.9.1\* Minimum Number. Stairs required to be accessible by [4.1](#) shall comply with 4.9.

4.9.2 Treads and Risers. On any given flight of stairs, all steps shall have uniform riser heights and uniform tread widths. Stair treads shall be no less than 11 in (280 mm) wide, measured from riser to riser ([see Fig. 18\(a\)](#)). Open risers are not permitted.

4.9.3 Nosings. The undersides of nosings shall not be abrupt. The radius of curvature at the leading edge of the tread shall be no greater than 1/2 in (13 mm). Risers shall be sloped or the underside of the nosing shall have an angle not less than 60 degrees from the horizontal. Nosings shall project no more than 1-1/2 in (38 mm) ([see Fig. 18](#)).

4.9.4 Handrails. Stairways shall have handrails at both sides of all stairs. Handrails shall comply with [4.26](#) and shall have the following features:

- (1) Handrails shall be continuous along both sides of stairs. The inside handrail on switchback or dogleg stairs shall always be continuous ([see Fig. 19\(a\)](#) and [\(b\)](#)).
- (2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top riser and at least 12 in (305 mm) plus the width of one tread beyond the bottom riser. At the top, the extension shall be parallel with the floor or ground surface. At the bottom, the handrail shall continue to slope for a distance of the width of one tread from the bottom riser; the remainder of the extension shall be horizontal ([see Fig. 19\(c\)](#) and [\(d\)](#)). Handrail extensions shall comply with [4.4](#).
- (3) The clear space between handrails and wall shall be 1-1/2 in (38 mm).
- (4) Gripping surfaces shall be uninterrupted by newel posts, other construction elements, or obstructions.
- (5) Top of handrail gripping surface shall be mounted between 34 in and 38 in (865 mm and 965 mm) above stair nosings.
- (6) Ends of handrails shall be either rounded or returned smoothly to floor, wall or post.
- (7) Handrails shall not rotate within their fittings.

4.9.5 Detectable Warnings at Stairs. (Reserved).

4.9.6 Outdoor Conditions. Outdoor stairs and their approaches shall be designed so that water will not accumulate on walking surfaces.

10.1 General. Every station, bus stop, bus stop pad, terminal, building or other transportation facility, shall comply with the applicable provisions of section 4, the special application sections, and the applicable provisions of this section. The exceptions for elevators in [4.1.3\(5\)](#), [exception 1](#) and [4.1.6\(1\)\(k\)](#) do not apply to a terminal, depot, or other station used for specified public transportation, or an airport passenger terminal, or facilities subject to Title II.

## 10.2 Bus Stops and Terminals.

### 10.2.1 New Construction.

(1) Where new bus stop pads are constructed at bus stops, bays or other areas where a lift or ramp is to be deployed, they shall have a firm, stable surface; a minimum clear length of 96 inches (measured from the curb or vehicle roadway edge) and a minimum clear width of 60 inches (measured parallel to the vehicle roadway) to the maximum extent allowed by legal or site constraints; and shall be connected to streets, sidewalks or pedestrian paths by an accessible route complying with [4.3](#) and [4.4](#). The slope of the pad parallel to the roadway shall, to the extent practicable, be the same as the roadway. For water drainage, a maximum slope of 1:50 (2%) perpendicular to the roadway is allowed.

(2) Where provided, new or replaced bus shelters shall be installed or positioned so as to permit a wheelchair or mobility aid user to enter from the public way and to reach a location, having a minimum clear floor area of 30 inches by 48 inches, entirely within the perimeter of the shelter. Such shelters shall be connected by an accessible route to the boarding area provided under paragraph [\(1\)](#) of this section.

(3) Where provided, all new bus route identification signs shall comply with [4.30.5](#). In addition, to the maximum extent practicable, all new bus route identification signs shall comply with [4.30.2](#) and [4.30.3](#). Signs that are sized to the maximum dimensions permitted under legitimate local, state or federal regulations or ordinances shall be considered in compliance with [4.30.2](#) and [4.30.3](#) for purposes of this section.

EXCEPTION: Bus schedules, timetables, or maps that are posted at the bus stop or bus bay are not required to comply with this provision.

### 10.2.2 Bus Stop Siting and Alterations.

(1) Bus stop sites shall be chosen such that, to the maximum extent practicable, the areas where lifts or ramps are to be deployed comply with section [10.2.1\(1\)](#) and [\(2\)](#).

(2) When new bus route identification signs are installed or old signs are replaced, they shall comply with the requirements of [10.2.1\(3\)](#).

## **VITA**

Frank Hardy Lewis Jr. was born in Jackson, Mississippi, on 31, December 1963, and was schooled in New Orleans, Louisiana and Brookhaven, Mississippi. He earned his high school diploma from Enterprise High School. He received a degree in advertising from the University of Southern Mississippi in 1995 and a graduate degree in mass communication from the University of Southern Mississippi in 1996. At the completion of coursework in the School of Landscape Architecture at Louisiana State University he began work as an independent contractor in landscape design and installation in the Baton Rouge, Louisiana area.